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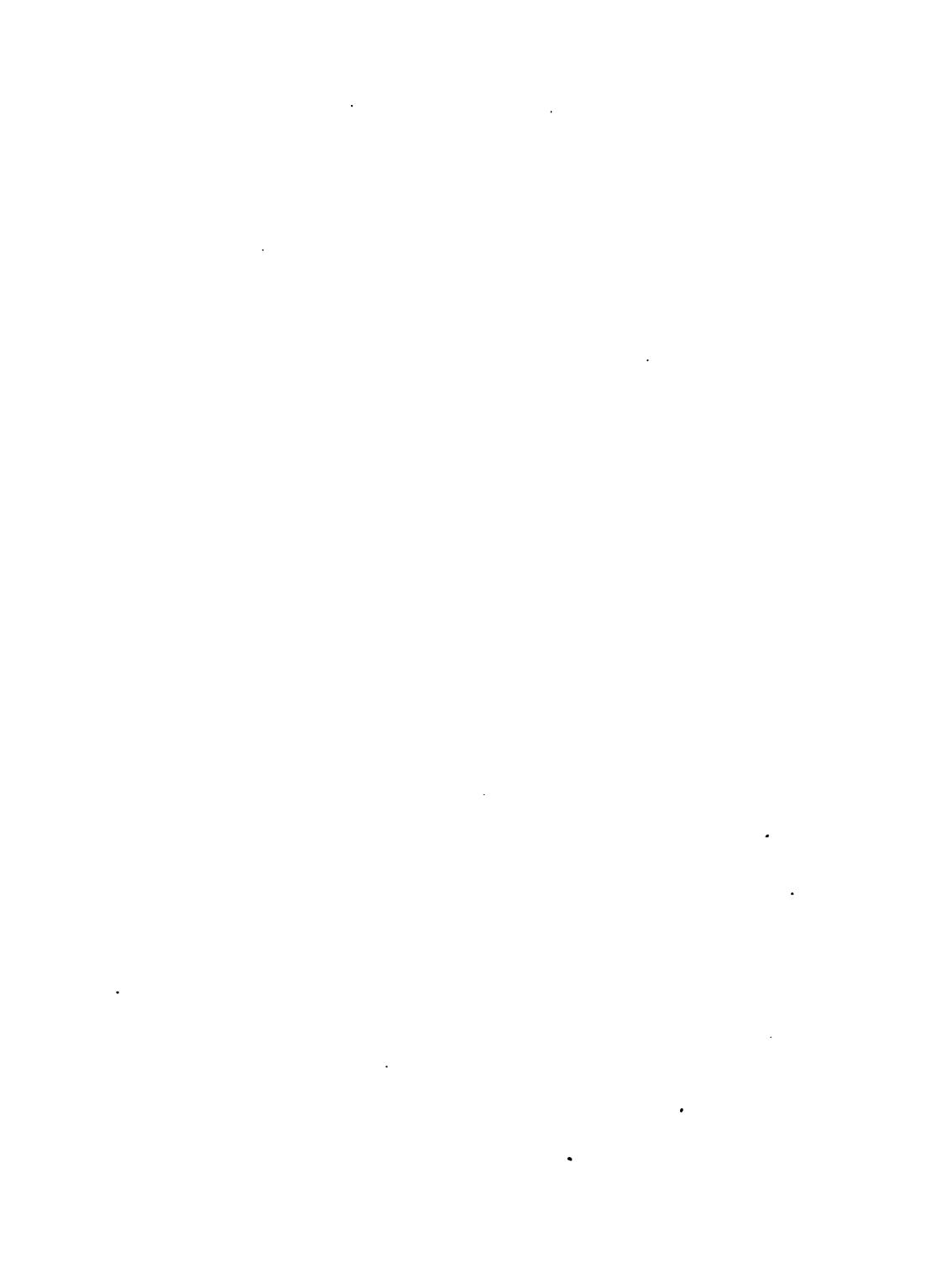
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The
GREAT WONDERS
OF
THE WORLD.











THE PORCELAIN TOWER OF NANKIN.—*See page 86.*

THE GREAT
WONDERS OF THE WORLD;

FROM

The Pyramids to the Crystal Palace.

DRAWN, FROM VARIOUS AUTHORITIES, BY FREDERICK SKILL,
AND ENGRAVED BY JAMES COOPER.

WITH ILLUSTRATIVE DESCRIPTIONS, WRITTEN AND COMPILED BY
A R T H U R C. W I G A N.

LONDON:
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B



PYRAMID OF CHEOPS.

THE Pyramids of Memphis, perhaps the most stupendous monuments extant of misdirected skill and energy, have from a very early period excited the curiosity and wonder of mankind. More than two thousand years ago they were visited by Herodotus, whose narrative affords the earliest information we possess as to their origin. According to the account

given to him by the priests of Memphis, the Great Pyramid was built about 900* years before the Christian era, by Cheops, king of Egypt. In its construction, 100,000 workmen were employed for twenty years, and the cost of feeding them upon onions and other vegetables amounted to nearly £400,000 of our money.

The Pyramid of Cheops is about 480 feet in height, and covers more than thirteen acres of ground. Placed in Lincoln's Inn Fields, it would occupy the entire space, over-topping, by more than 100 feet, the cross of St. Paul's.

This pyramid consists of a series of platforms, and the steps thus made vary from five to two feet in height. The vacancies were originally filled by highly polished casing-stones, the whole surface being thus rendered perfectly smooth. Some of this facing still remains upon the second and third pyramids.

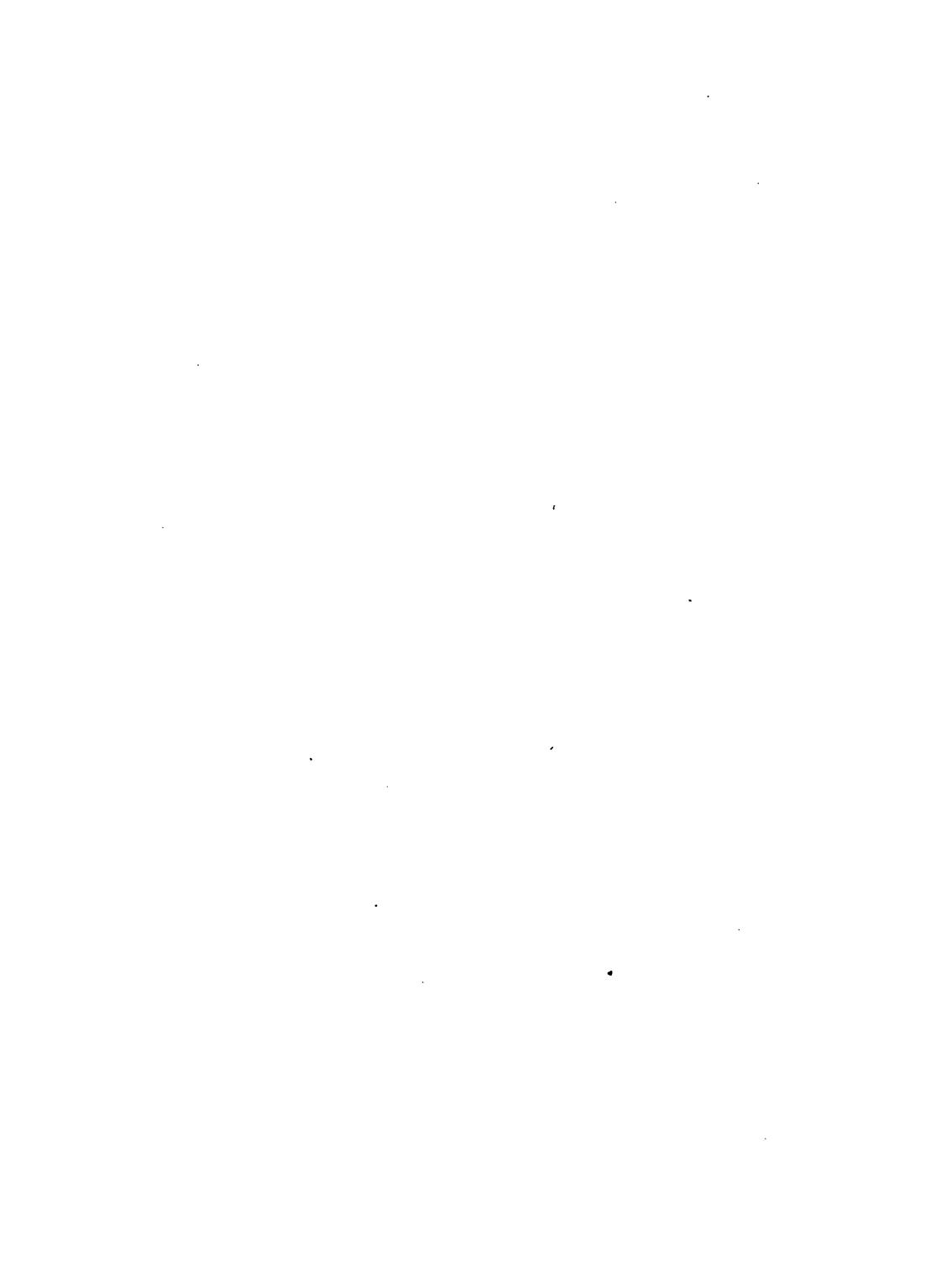
The ascent, though often performed with the assistance of the Arab guides, is laborious, and not without danger. Some years since an English officer lost his footing, and rolled from the top to the bottom of the Great Pyramid. Every bone in his body was broken, and he reached the ground a shapeless mass.

The interior of these singular and mysterious structures has not yet been fully explored, nor is it likely that our knowledge will ever be complete on the subject, so vast is their extent and so difficult and hazardous the undertaking. The entrance to the Pyramid of Cheops is by an orifice fifty feet above the foundation, and three and a half feet square. A narrow passage, seventy-three feet in length, and sloping

* Modern research has added more than 1200 years to the probable age of the Pyramids.

downwards, leads from the entrance to a second gallery, 109 feet long, but with an ascending inclination. At the end of this last passage there is a platform, in which is the mouth of a well, sunk into the body of the pyramid, and beyond it into the solid rock, where it has been traced to the depth of 145 feet. There is also a second passage or gallery, leading from the platform to what is known as the Queen's Chamber; but the ascending gallery above mentioned is continued for 132 feet beyond the platform, and leads to the King's Chamber, in which there is a sarcophagus of red granite, supposed to have contained the body of Cheops. Other chambers and galleries have been entered, and in all probability many more remain to be discovered.

The purposes for which the Pyramids were intended are not clearly known. They were undoubtedly used as sepulchres for and monuments of the dead, but their internal structure is hardly compatible with so limited a design. A curious observation has been made with respect to the narrow passages by which access is gained to the interior, but which can scarcely be supposed to have been the original means of entrance. The Pyramids have their sides directly facing the four points of the compass, and the galleries in question open on their northern faces. They are, moreover, so inclined as to point nearly to the pole of the heavens; and the Polar star of those days (α Draconis) must, in the time of Cheops and his successors, have been visible once in every twenty-four hours from the inmost recesses of the Pyramids. From this and other circumstances it is conjectured that they were also designed for astronomical and religious purposes.





THE SPHINX.

THE Sphinx is a fabulous being, occurring in the Grecian, Indian, and Egyptian mythologies. In Greece it was variously portrayed, but the figure was always a compound of the human and animal forms, and generally consisted of a woman's head united to the body of a lion or dog, with or

without wings. In India, on the other hand, the Sphinx was always represented with the head of a man.

The Egyptian Sphinxes have the upper portion either human (and mostly female), or they have the head of a ram; the body being that of a lion, without wings. They were usually placed at the entrance of temples, where they sometimes formed a long avenue leading up to the entrance. At Carnac there is one of these avenues, nearly two miles in length.

The largest of existing Sphinxes is the celebrated one which stands near the Pyramid of Cheops. With the exception of the paws, which are formed of masonry and project 50 feet beyond the body, it is hewn out of the rocky ledge upon which the Pyramids are built. It is of enormous dimensions, being 143 feet long and 62 feet in height. All but the head and neck was formerly buried in the sand, which in the course of ages had entirely filled up the surrounding hollow. The body was partially uncovered by the French, during their occupation of Egypt; and was afterwards entirely freed by Cavaglia at the expense of Colonel Vyse. The work was one of great labour and difficulty, the loose surface from above continually sliding into the excavation. An altar was discovered between the projecting paws. Steps led down into the vast area, which is now again half filled with drifted sand.

In the head of the figure there is a cavity about five feet deep; and it has been supposed that a passage led thence to the well of the Great Pyramid, the priests being by this means enabled to pronounce their oracles from the monster's head. This communication with the interior has, however, been doubted.

The features have been greatly mutilated by the Arabs, who

have used the Sphinx as a target for their arrows and djereeds. But the face, though partaking strongly of the Ethiopian or negro character, still possesses a calm and melancholy beauty which is recognised by every traveller. Seen among the surrounding tombs, it appears, says Stephens, "like a Divinity guarding the Dead."

Part of this effect is, however, in all probability due to association, and to the surrounding desert scenery and ruins. It must, at all events, be confessed that even well-executed drawings or engravings fail in conveying any impression of the kind to those who have not seen the original statue.



MEMNON.

ON the great Theban plain, upon the western bank of the Nile, are two Colossi, which, even in their sitting posture, are upwards of fifty feet in height. The northernmost of these is of granite, and has been identified with the famous Statue of Memnon, so often alluded to by ancient writers as hailing with music the beams of the rising sun.

Much discussion has arisen, and many opinions have been recorded as to the origin of the statue; some contending that Memnon was a real, others that he was a mythological, personage. Various etymologies have also been given of his name; which, however, is now agreed to be a Greek corruption of that of Amenophis II., of the eighteenth Egyptian Dynasty.

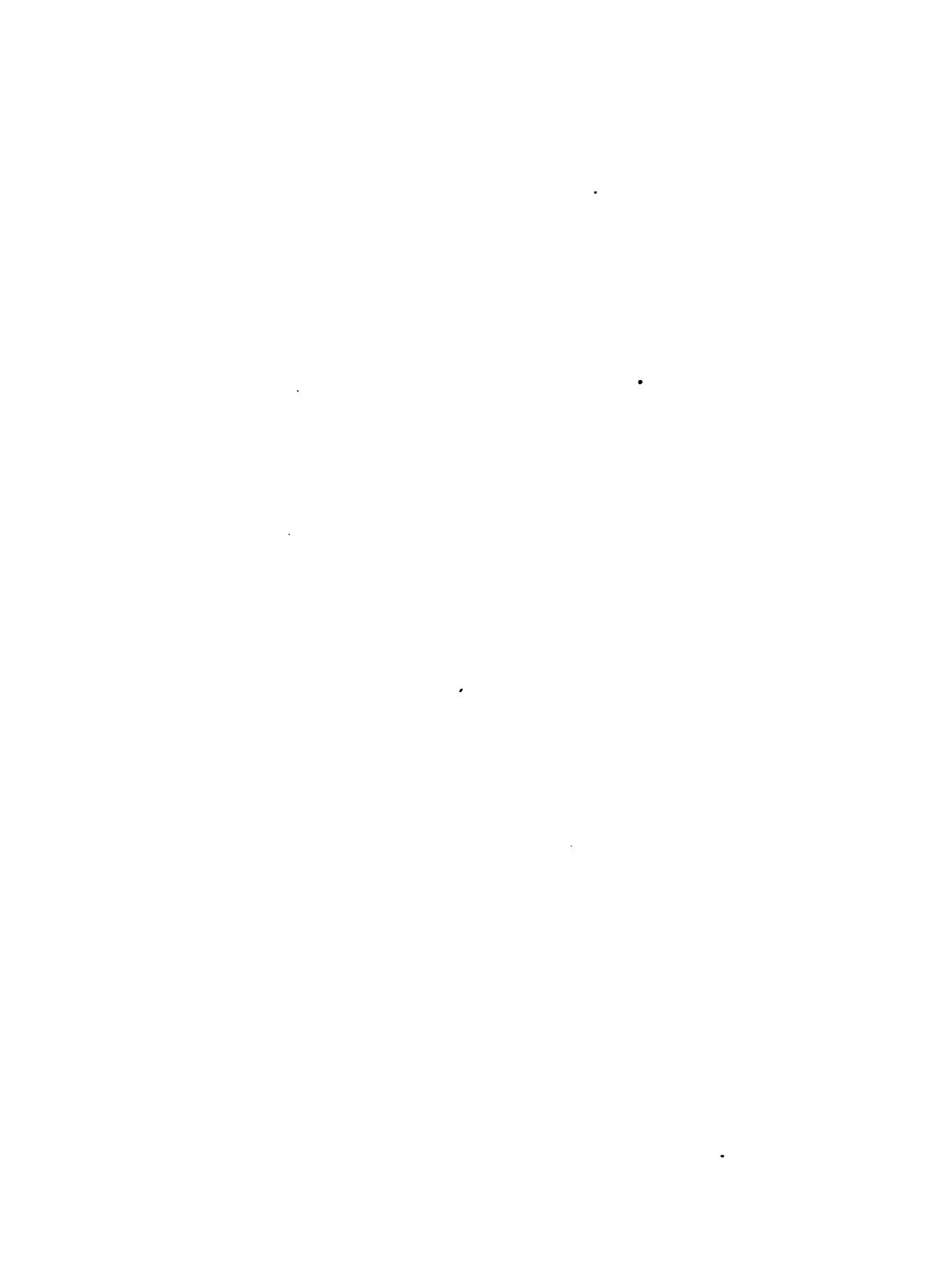
That the statue really emitted musical tones can scarcely be doubted. Strabo in company with Cælius Gallus heard them; and Pliny and Lucian also mention the fact as notorious in their time. The legs are, moreover, covered with inscriptions in Latin and Greek, commemorating the names of ear-witnesses. One of these inscriptions records the visit of Adrian and his Queen, Sabina.

The explanation must be conjectural, and innumerable suppositions have been made to account for the phenomenon. Kircher imagines that a sort of harpsichord was concealed within the statue, and that its strings were broken by the heat of the sun. Alexander Humboldt, in his South American travels, speaks of certain rocks on the banks of the Oronoko, which at sunrise produced musical notes owing to the escape of confined air from their numerous crevices. The French savans heard a similar effect at Carnac, on the eastern bank of the Nile. But these sounds can have borne little resemblance to those described by ancient writers, who liken them to the notes produced by the snapping of musical strings. Many cut the knot by attributing the effect to the artifices of the Priests, who, it is said, opposed this pretended miracle to the rise and progress of Christianity; and it is certain that since the fourth century, when the inhabitants of Egypt became Christians, we have heard no more of the vocal statue. But it is perhaps not difficult to invent a more plausible theory.

Analogous sounds might at all events be produced by a combination of levers, liberating a series of vibrating tongues by their expansion under the rays of an Egyptian sun. A simple arrangement would enable the levers to recover their position silently during the night.

“Whatever Memnon may formerly have done in the vocal line,” says Warburton, “much cannot be expected from him now, as his chest is gone, and replaced by loose stones.”

The greater part of the statue fell down b.c. 70, but was afterwards restored to its original position.





PETRA.

SURROUNDED in lofty mountains, and inaccessible save by a narrow ravine, stands the deserted city of Petra, the supposed capital of ancient Edom. Strong, firm, and immovable as Nature itself, its rocky ramparts seem to deride the walls of cities and the puny fortifications of engineers. This extra-

ordinary city is situated within a natural amphitheatre, some three miles in circumference; the sides of the enclosing mountains being cut smooth, and filled with long ranges of houses, temples, and tombs, excavated from the solid rock. Limited as was the space at their command, the inhabitants were in a manner driven to this expedient; and in the course of ages the excavations became so multiplied as to give the city the peculiar honey-combed appearance it now presents. It is of immense antiquity, but there is no reason to think that the temples and monuments at once received the profusion of ornamental details now so strikingly apparent. Indeed, the character of the architecture (if so it may be called) forbids the supposition; and these additions are evidently due to the refined and luxurious taste of a later age.

Petra was once a capital of great importance. The entire commerce of the East passed through Arabia Petraea to Phoenicia, Tyre, and Egypt; and Strabo informs us, that under the latter Ptolemies whole armies of camels were required to convey the merchandise.

The Temple shown in the engraving is hewn out of an enormous block of freestone, lightly coloured with oxide of iron. Its high state of preservation is owing to the shelter afforded by the surrounding rocks. Almost the only traces of decay are in the statues at the base, the projecting portions of which are injured by the humidity of the soil. One of the six columns has fallen, but without injuring the general effect. Had the structure been built, instead of excavated, the fall of this column would have involved the destruction of the entire edifice. The position of the temple is one of the most beautiful that can be imagined; the richness and exquisite finish of the decorations offering a remarkable contrast to the

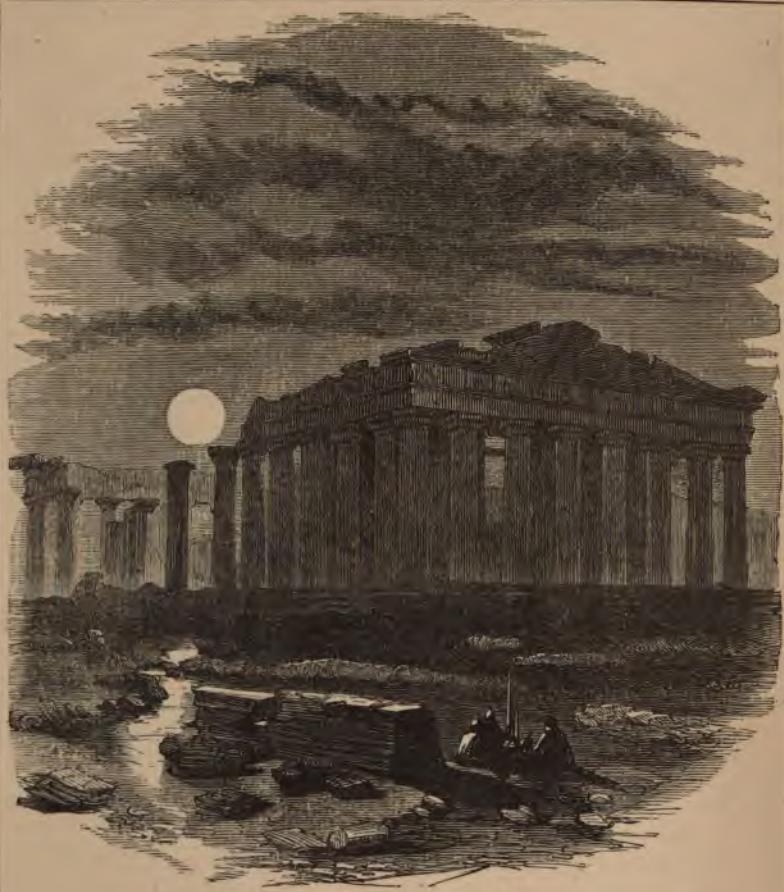
savage scenery around. It stands on a rising ground, in a small opening at the meeting of two ravines. The area is cut off from the city, and everywhere surrounded by impassable rocks, except where the ravine penetrates it to descend lower down : it is crossed by a stream overhung with a wild growth of oleander bushes, glowing with thousands of crimson flowers.

The name given by the Arabs to the excavation is "El-Khusne," or "The Treasure." They suppose vast riches to be contained in the vase surmounting the central lantern, and they often fire at it, hoping to bring down the imaginary contents. They fancy that the visits of the Franks are for the purpose of conjuring away, by some aërial magic, what they themselves are unable to lay hold of.

From the epoch of the Crusaders, who mention the locality as "Vallis Moysi" (the "Wady-Mousa" of the Arabs), until nearly our own times, the name and site of Petra appear to have been forgotten. The pilgrim to Mount Sinai during the middle ages, dared not deviate from the direct route across the Desert, already sufficiently dangerous ; and the traveller who beheld from afar Mount Hor jutting out like a beacon from the desolate mountains of Edom, little supposed that at its very foot lay hidden that ancient capital whose utter overthrow forms the burden of Jewish prophecy. To Burckhardt we owe the earliest notices of the long-lost city. Clad in the garb of a poor Arab, he was the first to explore its wonders ; and considering the furtive manner in which he was compelled to hurry through the place, his account is surprisingly accurate. But our best information is derived from M. Leon de Laborde, who in 1828 succeeded, in the face of much hostility, in collecting materials for the splendid work that first introduced Petra to the European public.

i

C



THE PARTHENON.

IN the age of Pericles, about five hundred years before the Christian era, Athens was at the height of her grandeur. The spoils of the Persian conquest enabled her rulers to engage in the most profuse expenditure, and the city became covered with magnificent temples, erected under the auspices of the greatest architect and sculptor that the world has seen.

But the genius of Phidias shone most brightly on the rock of the Acropolis. To its temple-crowned summit Pericles and the illustrious throng of Grecian heroes and sages ascended to worship ; and hither came Aspasia, with the great and high of Athens, to offer incense at the shrine of the Goddess of Wisdom.

On the highest point of the Acropolis, overlooking the Bay of Salamis, stands the masterpiece of Phidias, the world-renowned Parthenon, or Temple of Minerva. This edifice, together with most of the sculptures that adorned it, was of marble, taken from the quarries of Mount Pentelicus. In the fine atmosphere of Greece it has retained its purity of hue, save that, where most exposed to the weather, the marble has become tinged of a delicate pink. This has been recently found to proceed from a microscopic fungus.

The Parthenon was surrounded by forty-six columns, and embellished within and without by the chisels of the first sculptors of Greece. The most famous of its statues was that of Minerva, wrought of ivory and gold, by the hands of Phidias himself. In the production of ivory statues this great sculptor stood alone ; nor did he disdain to work in the meaner materials of wood and clay, or to carve minute objects, such as fishes and insects. The poet Martial, noticing some fish sculptured by Phidias, commends, in three words, their truth to nature—“*Adde aquam, natabunt.*” This attention to details implied no want of power when treating grander subjects. Those who beheld his Olympian Jupiter are said to have asked, in admiration, whether Jupiter had descended from heaven to show himself to Phidias, or whether Phidias had been carried thither to contemplate the god.

Time and the barbarian have done their work on the Par-

thenon, as on the other glorious monuments of Grecian art. The Romans were too refined to injure or neglect them; but after the Romans came the Goths, and after these the Turks, who, at once ignorant and proud, despised what they could not understand. In their hands the Acropolis became a garrison, and the Parthenon a powder-magazine. They were bombarded in 1687 by the Venetians, who directed their heavy artillery against its porticoes and colonnades. For another century and a half the work of demolition went steadily on. The Turks pounded the marble into dust to make lime, and travelling antiquaries removed fragment after fragment of the sculptures. At last, in 1801, when half the columns of the Parthenon had fallen, and the statues and friezes were menaced with total destruction, Lord Elgin, then our ambassador at Constantinople, obtained a firman which enabled the British nation to acquire the most valuable of the remaining sculptures. These are now in the British Museum, and are known as the Elgin Marbles. They have suffered much from time and violence, but enough, and more than enough, remains to attest their surpassing excellence.





FRIEZES OF THE PARTHENON.

No portion of the Elgin Marbles is more worthy of admiration than the Friezes of the Parthenon. The Metopes, a series of figures in high relief, surmounted the colonnade of the Temple, and were devoted to one subject, the contests of the Centaurs with the Athenians. They exhibit wonderful spirit and vigour of action, undisfigured by violent or extra-

vagant contortion. Female figures are occasionally introduced, which the Centaurs are supposed to be bearing away. A portion of these Metopes will be recognised in the lower right-hand corner of our illustration.

In the Frieze that adorned the east end of the Parthenon, and of which a fragment is given at the head of the engraving, are representations of Divinities and Demigods. On their right and left are trains of women bearing offerings; and at intervals are seen officers, who appear to superintend and regulate the ceremony. In the drapery of these female figures there is at first sight something harsh, wiry, and at variance with the breadth of style observable in the Elgin Marbles generally; but when seen from below, the sculptor's idea becomes apparent. The figures group into the finest masses, and the sharp and multiplied lines give an air of lightness and delicacy to the whole.

The remaining design is from the north side of the building. The subjects of this Frieze were chiefly composed of charioteers and horsemen, which last are considered to be of incomparable excellence. It is impossible to look at them without a feeling of exhilaration, as if the procession were really passing before us.

For the due appreciation of these noble works no technical acquaintance with art is necessary—they are executed with a mastery that addresses itself to the spectator in the broad and general language of nature. Many of the figures are greatly mutilated, and their beauty may not be apparent on a first inspection; but no one of moderately correct natural taste can long examine them without being struck by their extraordinary merit.

It is not in the human form alone that the sculptor's genius

is apparent. Whether in bronze or marble, the horse has never been so grandly represented as in the Friezes of the Parthenon. Even in the more tractable material of painting they have not been surpassed. The horses of Rubens, admirable as they are, are individual, but those of the Elgin Marbles exhibit the *generic* character of the animal; and the ideal horses of Phidias as far transcend those of an ordinary artist, as the Belvidere Apollo or the Antinous surpasses the ordinary human form.

The most casual observer will be struck with the grace and elegance of the riders. The fire and vivacity of these figures are finely contrasted with the devout and reverential air of the women who lead the procession.

In the "Greek Court," in the Crystal Palace, at Sydenham, may be seen a restored cast of this celebrated Frieze, with the figures slightly coloured.





THE OLYMPIAN JUPITER.

DURING a long series of ages, Grecian sculpture underwent a gradual process of development, from the primitive use of clay or the commonest woods, to the employment of woods of rarer growth, such as cedar and ebony, of marble, and of metals, occasionally of the most precious kinds, until it reached, according to the taste of antiquity, the highest point

of perfection in the combination, on a large scale, of ivory and gold. Accounts have been handed down to us of these colossal statues, of which no specimen remains, and which even appear repugnant to our ideas of the beautiful in Art; but independently of the delicacy of the material, and of its capacity for the highest polish, it must be acknowledged that there was something striking in the reflection that these prodigious monuments of sculpture (which, uniting all the characteristics of the lovely and the majestic, might well command the most profound reverence) required for their completion the slaughter of hundreds of mighty beasts in distant regions of the world.

The remains of ancient statuary in marble and bronze can give us no definite idea of these stupendous works; but it is clear from the descriptions given, that the highest genius, calling to its aid a mechanical dexterity scarcely less worthy of admiration, rendered them fit embodiments of the ideal gods whose temples they adorned. Nor can we doubt that they were especially calculated to extend the influence of a religion that appealed to the senses for a belief which the reason would probably have withheld.

The most celebrated of these colossal statues was the Olympian Jupiter, of Phidias. It is described with some minuteness of detail by Pausanias. "The God," says this author, "made of gold and ivory, is seated on a throne. On his head is a crown, representing an olive branch. In his right hand he carries a Victory, also of gold and ivory, holding a wreath, and having a crown upon her head. In the left hand of the God is a sceptre, shining with all sorts of metals. The bird placed on the summit of the sceptre is an eagle. The sandals of the God are of gold, and his mantle is also golden."

The figures of various animals, and of all sorts of flowers, particularly of lilies, are painted upon it. The throne is a diversified assemblage of gold, of precious stones, of ivory, and of ebony, in which figures of all kinds are also painted and sculptured."

Pausanias then proceeds to describe the accessories of the statue and throne, such as the ornaments in bas-relief and the base, but he does not give the dimensions of the statue. The omission is supplied in a striking manner by Strabo. "Phidias," he says, "had made his Jupiter sitting, and touching almost the summit of the roof of the temple, so that it appeared that if the God had risen up he would have lifted off the roof." The height of the temple was about sixty English feet.

The accompanying illustration is of course only ideal, since, as before observed, no remains are extant of the ivory and gold sculpture. The restoration was made by M. Quatremère de Quincy, a French writer, who has devoted a large folio to the subject of these statues.



THE GREAT WALL OF CHINA.

CHINA stands alone among the nations of the world, and differs more palpably by its institutions, inhabitants, arts, and manufactures, from other countries claiming to be civilised, than any two of these differ from each other.

The Great Wall surrounding the country, and built to defend the empire from Tartar aggression, is familiar to us

from childhood as one of the Wonders of the World. Ineffectual for the purpose for which it was constructed, it is yet an astonishing work, and impresses us with a high idea of Chinese industry and perseverance. From the Eastern Ocean to the frontiers of the province of Cham-si, a distance of about 200 leagues, it is composed of stone and brick, with strong square towers at intervals, and a well-constructed fortress at every important pass. In this part of its extent the Wall is in many places double and even triple; but, from the entrance of the above-named province to its western extremity, it is little more than a terrace of earth, at some points almost obliterated. The towers also are here mostly of earth.

The Wall is carried over the tops of high and apparently inaccessible hills; and it is not easy to understand how the materials were conveyed there, or how the Chinese could construct forts in spots where European engineers would have abandoned the attempt in despair.

In its strongest part the Wall of China is composed of two walls a foot and a half thick and many feet apart, the intervening space being filled up with earth. In height it averages twenty feet, and there are steps and inclined planes leading to the top, where six horsemen can ride abreast without inconvenience. The towers are generally about forty feet high.

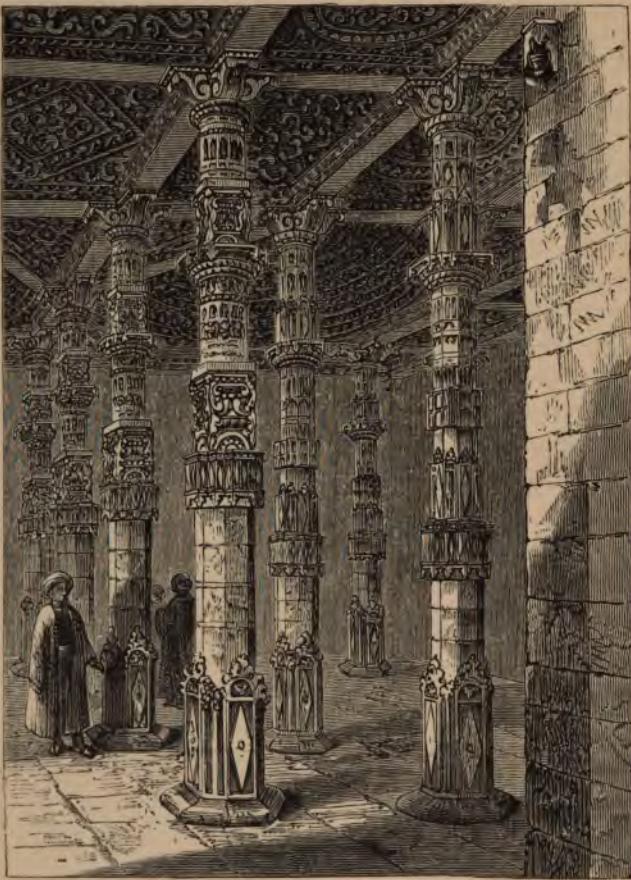
The contrast between the country within and the wilds without, is in some places most striking. On one side is a cultivated plain, swarming with inhabitants; on the other a savage desert, abounding with wild beasts, and seemingly untrodden by the foot of man.

The Wall itself offers an imposing sight, striding over lofty mountains, and traversing one vast plain after another. It is

more than 2000 years old, having been completed b.c. 205. The work is said to have been finished in the space of five years. Many millions of labourers were employed upon it, the Emperor having impressed for the purpose three men out of every ten throughout his dominions.

Some curious calculations have been made to assist the conception of the magnitude of this extraordinary work. All the houses in Great Britain would not furnish materials for the Wall of China, exclusive of the massive towers, which alone contain as much masonry and brickwork as the City of London. The mass of matter is more than sufficient to surround the globe in its greatest circumference, with two walls, each six feet high and two thick. In this calculation, however, the earthy part in the middle is included.

D



TEMPLE OF AJMEER.

ONE of the most ancient specimens of Hindoo architecture is the Temple of the Jainas, at Ajmeer, in the province of Rajpootana.

The Jainas are a numerous and influential sect, who have, for a long course of ages, protested against the innovations introduced by the Brahmins into the primitive religion of the

country. They believe in one God and in a future state. They hold that the righteous and wicked will be born again in another world, and receive reward or punishment according their deeds in this life. According to the Jainas, there are three distinct worlds—the *upper world*, containing seven separate dwelling-places, where rewards are proportioned to the merits of the virtuous ; the *lower world*, also in seven divisions, appropriated to the punishment of the wicked ; and the *middle world*, inhabited by mortals, where virtue and vice reign together. The course of time is divided by them into six periods, during each of which a different order of nature prevails, and between which the world is totally renewed.

The rules of conduct of the Jainas are much more severe than those of the Brahmins. They not only abstain from animal food, but even from all vegetables that might possibly contain insects, etc. Their sole diet consists of milk, rice, and various species of peas. Their fear of destroying life is such that, when drawing water, they interpose a linen cloth, lest any living creature should find its way into the vessel. For the same reason, if a traveller stoop to drink at a spring, he first covers his mouth. A devout Jaina will not keep a lamp lighted when flies or moths might be likely to destroy themselves in the flame.

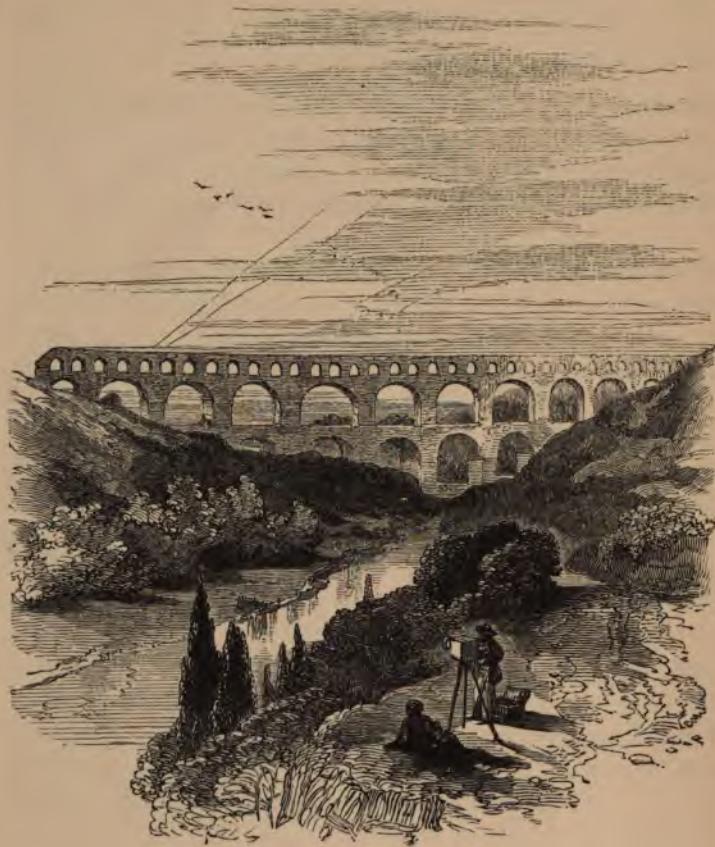
The number and importance of these Hindoo Puritans were long underrated. It is true that their influence is not what it was five or six hundred years since, but it is still very considerable, and more than half the commerce of India is in their hands. One of the minor sects into which they are divided has eleven thousand preaching missionaries distributed over the country ; and another branch of the

Jainas is known to comprise 100,000 families. All the more remarkable religious edifices in India belong either to the Jainas or to the Buddhists. The word Jaina is derived from the Sanscrit "jina," or victorious, the generic name of their deified saints.

The Temple of Ajmeer is supposed to have been built about 200 B.C. The exterior is more recent, and is in itself a fine specimen of Saracenic architecture; but the interior is Hindoo, and perfectly unique in character. It consists of a vast hall, with a quadruple row of columns especially worthy of admiration. They resemble each other in their general character, but the details are different in each column; and the architect has exhausted his fancy in the profusion of rich and beautiful devices with which they are covered. The central portion, or what we should term the nave, is arched; the ceiling of the side portions, or aisles, is divided into delicately sculptured compartments.

The Temple is inscribed to the Supreme Being; One, Indivisible, without extension or parts. The popular name of the edifice is "Urai din ca jopra," or, "two days and a half," that being the time which, according to the tradition of the country, the architect bestowed upon the work.





THE PONT DU GARD.

BETWEEN three and four leagues from the ancient city of Nismes, in the south of France, and crossing the valley and river of the Gard, or Gardon, is a gigantic bridge, forming part of an aqueduct built by Agrippa, the son-in-law of Augustus. Uniting two mountains, and spanning the heavens like a rainbow of granite, this colossal work is the most

imposing relic that time has handed down to us of the engineering skill of the Romans.

The bridge consists of a triple tier of arcades, the lowest of them containing six arches, the intermediate eleven, and the highest thirty-five. This last supports the aqueduct : it is about 160 feet above the river, and a thousand from end to end. The aqueduct was covered with stone slabs, eight feet long, and placed side by side without cement or other fastening. Where they yet remain, a man of moderate height can stand upright under them without inconvenience.

When Gaul was invaded by the barbarians, they are said to have been so struck by the sublimity of the Pont du Gard, that they relinquished their intention of destroying it. Possibly the massive construction, rather than the grandeur of the edifice, deterred them from the attempt, for the aqueduct itself was much injured, and its waters thenceforth ceased to flow.

In 1564, Charles IX. visited the Pont du Gard. He was received by the Duc de Crussol, who gave a grand entertainment by the river-side in honour of the event. Near the aqueduct is a cave or grotto, from which twelve young girls came forth, dressed as nymphs, and offered the King a repast of pastry and preserved fruits.

In 1747, a causeway was constructed for the use of carriages and foot-passengers by the side of the second tier of arches. The authorities of Nismes were so proud of their work that they struck a medal, with the inscription, "*Nunc utilius.*" It is superfluous to say that this modern addition to the master-piece of Agrippa appears as an impudent intrusion by its side. "It was reserved for the eighteenth century," says Alexandre Dumas, in his picturesque descrip-

tion, "to dishonour a monument which the barbarians of the fifth had not dared to destroy."

Much has been written about the labour wasted by the Romans in constructing aqueducts, which might, it is said, have been dispensed with if they had better understood the principles of hydrostatics. But (not to speak of the superior grandeur of an aqueduct as contrasted with modern underground contrivances) it may, perhaps, be doubted whether this great and sagacious people were not in these matters fully as well informed as ourselves. The miserable supplies of one of the first necessities of life, doled out to us by cisternsful at a price that the poor cannot afford, are a poor substitute for the profusion of the healthful element placed at the disposal of every Roman citizen.



THE COLOSSEUM.

UNDER the Roman emperors, the sports of the Amphitheatre were conducted upon a scale of increased magnificence. Caligula, on his birthday, gave eight hundred beasts to be slain. Claudius instituted combats between horsemen and wild bulls, or between horses and camels. During his reign and that of Nero, an elephant was sometimes opposed to a single fencer, and hundreds of ferocious animals were often slaughtered by guards on horseback.

The passion for these sports required for its gratification a more spacious theatre than the old Circus. The Colosseum was accordingly commenced by Vespasian, and completed by Titus, A.D. 79. Notwithstanding its immense size, its construction occupied but three years. Great part of the wall remains entire, though succeeding generations have resorted to it as to a quarry, and the very clamps of iron and brass that held the ponderous stones together have been removed by Gothic plunderers.

The Colosseum is of an oval form, and occupies the space of nearly six acres. The outer wall, where it remains entire, is 157 feet high, and is divided into four stories, each ornamented with a different order of architecture. Two corridors ran all round the edifice, and led to staircases ascending to the several stories. The seats which descended towards the arena occupied the greater part of the space. Immediately above and around the central opening was the Podium, on which were seated the Emperor, Senate, Ambassadors, and other dignitaries. From the podium to the top of the second story the seats were of marble, for the equestrian order; above the second story they were of wood. On these various seats 80,000 spectators could be arranged according to their respective ranks.

In 1813 the arena was excavated throughout its whole extent, and a great number of underground structures discovered, which are supposed to have formed dens for the wild beasts that were exhibited. The following quaint and graphic description is by the old French philosopher Montaigne, and gives a correct idea of the amusements of the Colosseum. "It was doubtless a fine thing to bring and plant within the theatre a great number of vast trees, with all their branches

in their full verdure, representing a great shady forest disposed in excellent order; and the first day to throw into it a thousand ostriches, a thousand stags, and a thousand fallow deer, to be killed and disposed of by the people; the next day to cause a hundred great lions, a hundred leopards and three hundred bears to be killed in his presence; and for the third day, to make three hundred pairs of fencers to fight it out to the last, as the Emperor Probus did. It was also very fine to see those vast amphitheatres all faced with marble without, curiously wrought with figures and statues, and the inside sparkling with rare decorations and enrichments; all the sides of this vast space filled and environed from the bottom to the top, and covered with cushions where 100,000 men might sit placed at their ease; and the place below, where the plays were played, to make it, by art, first open and cleft into chinks, representing caves, that vomited out beasts designed for the spectacle; and then, secondly, to be overflowed with a profound sea full of sea-monsters, and loaded with ships of war to represent a naval battle; and, thirdly, to make it dry and even again for the combats of the Gladiators; and, for the fourth scene, to have it strewed with vermillion and storax instead of sand, there to make a solemn feast for all that infinite number of people, the last act of only one day. Sometimes they have made a high mountain advance itself, full of fruit-trees and other flourishing sorts of woods, sending down rivulets of water from the top, as from the mouth of a fountain. Otherwhiles a great ship was seen to come rolling in, which opened and divided of itself; and, after having disgorged from the hold four or five hundred beasts for fight, closed again, and vanished without help."



THE LAOCOON.

THE fabulous story of Laocoön, priest of Apollo, is familiar to every reader of Virgil. He dissuaded the Trojans from admitting into their city the wooden horse constructed by the Greeks, and consecrated by them to Minerva. The Goddess, in revenge, sent two enormous serpents, which, issuing from the sea, attacked Laocoön and his two sons at

the altar, where they had been commissioned by the Trojans to propitiate Neptune by the sacrifice of a bullock.

This incident forms the subject of the celebrated group represented in our engraving. It was discovered behind the baths of Titus, and is now one of the chief ornaments of the Vatican. It is nearly ascertained to be identical with the group spoken of in Pliny's Natural History, as having been in the palace of Titus. In the judgment of this writer it was unsurpassed as a work of art. "Three most excellent sculptors," he adds, "united to produce this work, which was made of a single stone, both the principal figure, the children, and the snakes. The sculptors were all natives of Rhodes: their names were Agesander, Polydorus, and Athenodorus."

The group in the Vatican is not made of a single stone; such a combination of figures as Pliny describes could indeed scarcely be carved from one and the same block. Possibly the writer was careless in speaking of this subject, as he has been on many other occasions, or he may have been deceived by the accuracy with which the parts were united together.

The Laocoön has been the theme of much discussion, and has even been condemned by some critics, who maintain that physical suffering is not a proper subject for Art. The group is undoubtedly open to objection, especially as regards the two snakes; and it is evident that the sculptors were imperfectly acquainted with the habits of this class of animals. The Constrictor serpents entwine themselves round their prey in a manner widely different from what is here represented, and they do not *bite* like the venomous species. But, conceding this and other points urged against the Laocoön, it must be admitted to hold a very high rank as a specimen of

skill in sculpture. The appearance of mental and bodily anguish in the figure of the priest is intense, nor can anything be more faithfully rendered than the helplessness and deprivation of force in the limbs of the boy who has already received the fatal wound.

This group is of itself sufficient to prove that perfect Grecian Art was not limited, as has been maintained, to the short period of Phidias and his immediate successors, but remained unimpaired during the first and second centuries of the Christian era.



TEMPLE OF THE SUN AT BALBEC.

FEW remains of the ancient world appeal more forcibly to the imagination, or are more suggestive of departed greatness, than the six isolated columns of the Temple of the Sun at Balbec, in Syria. The glorious luminary salutes them with his earliest and latest beams, and seems to linger fondly on the scene of his departed worship.

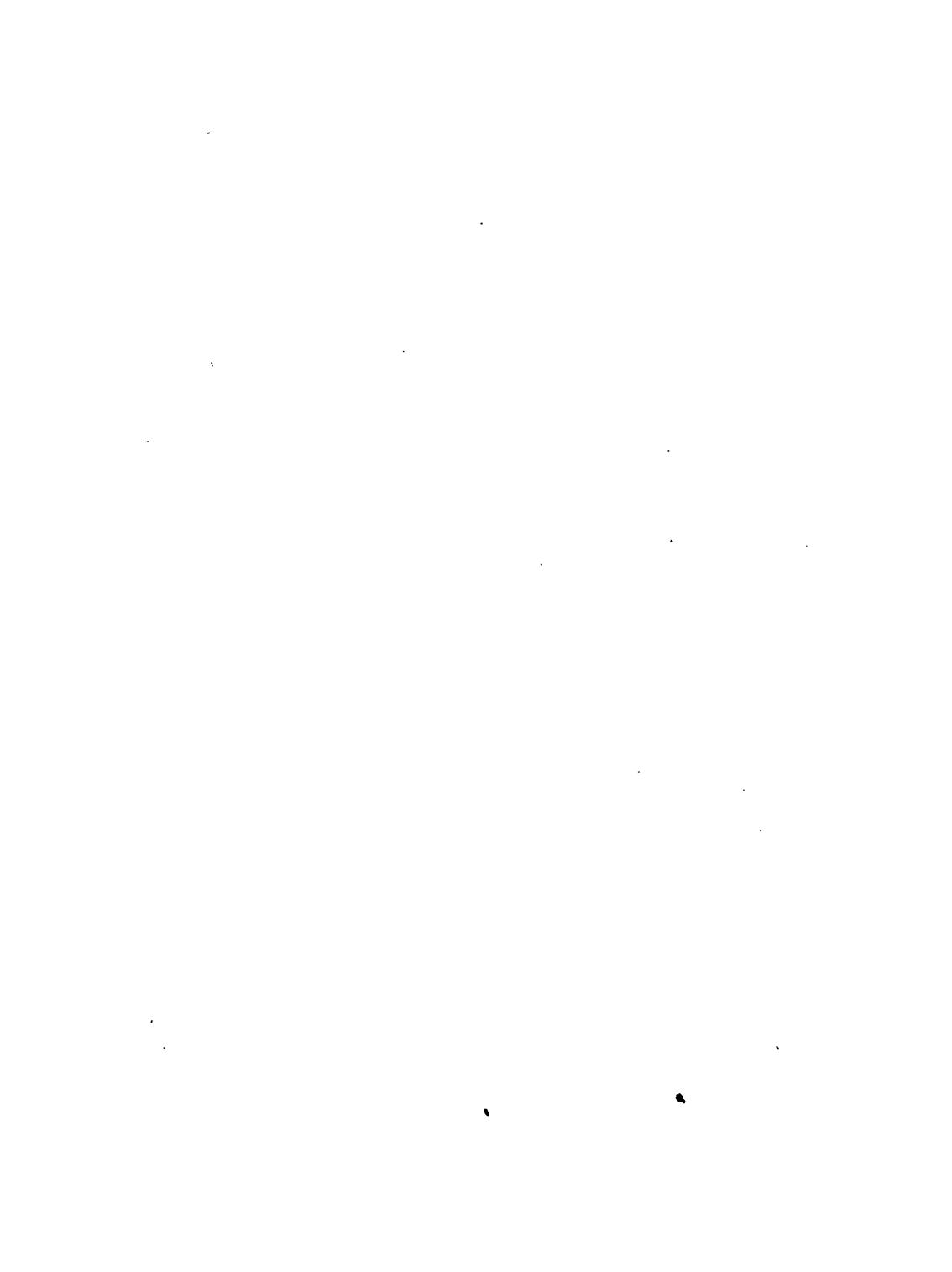
Balbec, or Baalbec, has been identified with the Heliopolis of Greek and Roman authors. It was called Heliopolis after the Egyptian city of the same name, from whence, in remote antiquity, the worship of the sun was brought into Syria. Balbec was probably the ancient as well as modern appellation, though the name has only been handed down to us in its Greek form. The two words are similar in their etymology—one signifying the City, the other the Vale of the Sun.

The buildings are mostly of the Corinthian order. John of Antioch states that the great Temple was built by Antoninus Pius in the second century, and many circumstances seem to favour this conclusion. But, according to the tradition of the country, Solomon was the founder of Balbec, and many stories are related of the manner in which he passed his time there. Critics, too, have not been wanting who have maintained the Temple to be the "Tower of Lebanon which looketh towards Damascus," probably on the strength of its site, which is in one of the valleys of Mount Libanus. The supposition is the more absurd, inasmuch as it presumes Solomon to have been acquainted with Corinthian architecture.

The ruins of Balbec do not, like those of Palmyra, present a crowd of fallen edifices. They consist of but three distinct buildings, standing near each other in a plain not far from the modern town. Of these the Temple of the Sun is the most important. The entrance is from the east, through what was once a noble portico of twelve columns, whose bases alone remain. The first apartment entered by the visitor is a hall, of hexagonal shape and 180 feet in diameter, exhibiting on all sides the remains of architectural magnificence. Further on is a quadrangular court of imposing dimensions, and beyond this the Temple, properly so called. This was once supported

by fifty-six columns, of which those represented in the engraving are all that remain standing. When Balbec and Palmyra were visited in 1751 by Dawkins, there were nine of these columns erect, but three were overthrown by the earthquake of 1759, and many other changes have since taken place. For these nature is not alone responsible: the Turks have had their share in the devastation, their sole motive appearing to have been the possession of the iron clamps joining the blocks together. The columns are of admirable workmanship; the stones are united without the aid of cement, and yet so closely that the blade of a knife can barely be inserted between them. Though fifty or sixty feet in height, each column consists of but two, or at most three portions.

Not less wonderful than the Temple is the terrace, or "soubassement," by which it is surrounded, and which contains stones thirty feet long, and of proportionate breadth and thickness. Three of them indeed at the western end are of the enormous length of sixty-four feet. The quarry whence these colossal blocks were hewn is near the city walls, and some stones of similar dimensions are still to be seen there, cut from the rock but not yet removed. It has been hence concluded that the soubassement was never finished. We are ignorant of the means employed to move these enormous masses. The inhabitants have a commodious way of settling the question. They affirm that the edifice was constructed by Genii, under the orders of King Solomon, and being unfettered by mechanical laws, these supernatural workmen of course easily accomplished the task.





WESTMINSTER ABBEY.

THIS noble specimen of Gothic art is, like the Cathedral of St. Paul, the last of several successive structures which have occupied the same spot. Ancient legends assert the first of them to have been a Temple of Apollo. Of this, however, no traces were ever discovered, and the temple is probably as

mythical as the Temple of Diana, said to have existed on the site of St. Paul's.

The ground on which the Abbey stands formed part of a small island made by a branch of the river, and called Thorney Island, from the number of thorn-trees which grew upon it. In the twelfth century (and probably much later), the open stream was crossed by a bridge at King Street, and its bed still exists in the shape of sewers.

Here, according to the generally received opinion, Sebert, King of Essex, being converted to Christianity, built a church, and dedicated it to St. Peter. It seems highly probable that Sebert was the original founder of Westminster Abbey, from the care with which his remains and those of his Queen, Ethelgotha, were preserved and redeposited in the most honourable place, whenever the church has been rebuilt or repaired. But the early history of this venerable edifice is involved in great obscurity, some writers contending that it had no existence a century after the time of Sebert; while others maintain that he was the founder not only of Westminster Abbey but also of St. Paul's Cathedral. A fable of singular audacity was framed by the monks on the subject of the first consecration of Westminster Abbey. They pretended that the ceremony had been performed by St. Peter himself; and, towards the middle of the thirteenth century, the brethren of the monastery, on the plea that the Apostle had given them this right when consecrating the church, actually sued the minister of Rotherhithe for the tythe of all the salmon caught in his parish.

After the death of Sebert, his subjects relapsed into paganism, and the Abbey fell into decay. It was restored by Offa, King of Mercia; again almost destroyed during the

Danish invasions; and once more repaired and endowed in 969 by King Edgar, at the instigation of St. Dunstan. Nearly a century after this, Edward the Confessor, having fixed on the Abbey as his burial-place, resolved to rebuild it from the foundations, and, as we are told, devoted to this work “the tenth part of his entire substance, as well in gold, silver, and cattle, as in all his other possessions.” The pious King barely lived to witness its completion. He was seized with his fatal illness on Christmas-day, 1065, three days before the time appointed for the dedication of the building.

The structure raised by the Confessor was in the form of a cross, and is supposed to have been the first English church so built. It remained without receiving any repairs or additions until the reign of Henry III., who, finding the eastern portion much wasted by time, began to rebuild the Abbey on a scale of great magnificence. The work proceeded slowly, and was still unfinished at the accession of Henry VII. This monarch added the beautiful chapel dedicated to the Virgin, and known as Henry the Seventh’s Chapel. Since his time the principal alterations are those made by Sir Christopher Wren. Great as he was, Sir Christopher despised Gothic architecture. The incongruity of his additions can only be exceeded by the bad taste subsequently displayed in the interior, where monuments of various degrees of merit (and of no merit at all) are placed side by side—Gothic arches being blocked up, and pillars mutilated, to make room for marble clouds and cherubim.





THE LEANING TOWERS OF BOLOGNA.

THE taller of the two Leaning Towers of Bologna, though in reality less out of the perpendicular than the more celebrated Campanile, at Pisa (so well known by the alabaster models in our shop-windows), is more strikingly paradoxical in its appearance. This effect arises partly from the smooth sides which direct immediate attention to the line of inclination, but still

more from its great height, which is not less than 307, or, according to some accounts, 377 feet, while the Tower of Pisa is only 200 feet high.

In the case of the latter, at least, it seems singular that two opinions should have existed as to the cause of the phenomenon; for not only are most buildings of any antiquity more or less out of the perpendicular (the Monument at London Bridge, for example), but the Observatory of Pisa and a neighbouring Belfry are in the same state as the Leaning Tower, though in a less degree. In fact, the soil is extremely insecure, and water is everywhere to be found six feet below the surface. The question has been finally set at rest by the discovery of a fresco-painting in the Campo Santo, in which the now Leaning Tower is represented upright. In the case of the Bologna Towers the cause of the inclination was, no doubt, the same, though we have no direct evidence on the subject. As to the fact of these curious structures standing, it is well known that a building is always secure provided the "line of direction fall within the base;" that is to say, provided the greater part of it be supported on the ground. The Leaning Towers of Pisa and Bologna are the most striking exemplifications of the principle, but even in our own country, examples are not wanting. One of the towers of Caerphilly Castle, in Glamorganshire, is eleven feet out of the perpendicular, and between seventy and eighty in height.

The Towers of Bologna were probably erected by private families, as places of refuge during the civil wars and feuds that so long desolated Italy. The small republics were at war with each other, or with the German Emperors; every city was distracted by the furious Guelph and Ghibelline factions;

and every street, frequently every family, divided against itself.

The taller of these Towers was built A. D. 1109. It has little external beauty, but rewards the traveller for a tedious ascent of 500 steps, by an extensive view of the surrounding country, including the cities of Ferrara and Modena. The smaller of the two, called the Tower of the Garisendi, is immortalised by Dante, who compares it to the stooping Antæus. It is about 150 feet in height, and deviates seven or eight feet from the plumb-line.





CATHEDRAL OF NOTRE DAME.

NOTRE DAME, the metropolitan church of Paris, occupies the south-eastern extremity of the island in the river Seine, called L'Isle de la Cité. It is a Gothic building of great beauty, intimately connected with French history, and teeming with associations of the highest interest.

The spot on which the Cathedral stands seems to have

been sacred ground from very remote antiquity. In making some excavations under the choir in the year 1711, there were found, fifteen feet below the surface, nine stones, evidently intended for an altar, and containing, indeed, the remains of ashes and incense. These stones bore inscriptions showing that the altar had been dedicated jointly to Esus (the Celtic Mars), Jupiter, Vulcan, Castor, and Pollux. There is no reason to suppose that it was covered by a Pagan temple, for the Gauls always placed their sacred edifices outside the towns, whereas this altar must have stood in the heart of ancient Paris.

The first Christian church built on the site of Notre Dame was erected A. D. 375, during the reign of Valentinian I. It was dedicated to St. Stephen, and was long the only ecclesiastical building in the city. About 522, Childebert I., son of Clovis, erected a second, close beside the first, and dedicated it to the Virgin. The present Cathedral comprises nearly the whole space occupied by its two predecessors. It was commenced by Philip II., surnamed Philip Augustus, who occupied the throne from 1180 to 1223. The work was carried on with the deliberation common in those days, and suitable at all times for structures intended to last for centuries. The Cathedral was not finished till about the middle of the fourteenth century, towards the close of the reign of Philip VI.

The principal front of Notre Dame is the western. It consists of three portals, surmounted by a pillared gallery. Over this is a central, with two side windows, by which principally the church is lighted. Above them is a second gallery, also supported by columns, and at each extremity is a square tower of massive character. The architecture is florid, and, like that of other mediæval cathedrals, abounds in grotesque or-

naments. The feeling that prompted these singular desecrations remains enveloped in mystery, notwithstanding the theories formed to explain and even justify them.

Originally a flight of thirteen steps led up to the door, but the surrounding soil is now considerably higher than the floor of the church. The lower gallery formerly contained statues of the Kings of France, from Childebert to Philip Augustus, but they were pulled down and destroyed in the early fury of the Great Revolution. The Cathedral sustained many other injuries in the confusion of those times. The greater number of its most ancient and curious decorations were removed ; nor have the effects of succeeding dynasties sufficed to restore the temple to its former splendour. The walls of Notre Dame are of immense thickness, and the 300 columns, from which spring the arches supporting the roof and galleries, are also of great size, and each formed of a single block of stone.

Of forty-eight chapels surrounding the Cathedral, thirty still remain. The choir, with its altar and sanctuary, are richly decorated, and many fine paintings by French artists adorn various parts of the Church. The nave is singularly gloomy, but this gloom adds greatly to the impressive effect of the interior.

Notre Dame contains many relics, such as the regalia of Charlemagne, etc., which are preserved with great care. Not the least interesting of them (however questionable the taste shown in exhibiting it) is a portion of the skeleton, with the bullet which caused his death, of the heroic Archbishop Affre, who was shot on a barricade during the insurrection of 1848. This faithful minister of peace virtually put an end to the insurrection by his own martyrdom, and the shot that killed him was the last that was fired.



CATHEDRAL OF AMIENS.

THIS magnificent structure is the third Cathedral recorded to have occupied the same site. Its two predecessors were successively destroyed by fire (the common fate of public buildings in those days) in 1019 and 1218. When the latter of these catastrophes occurred, Bishop Evrard, a zealous and energetic prelate, occupied the see of Amiens, and no time was lost in

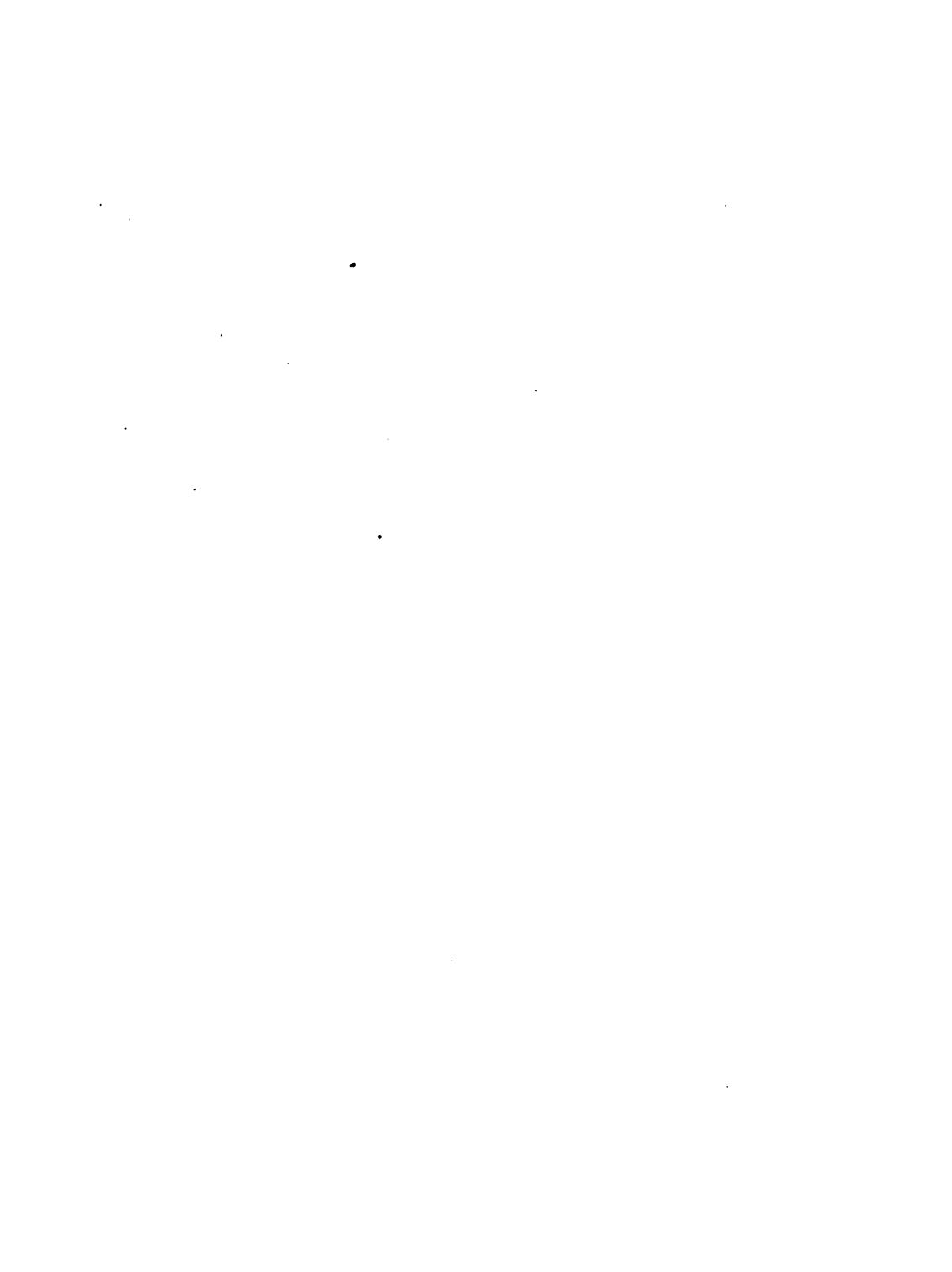
commencing the erection of a new and more splendid edifice. Money being collected by every available means, the present Cathedral was commenced in 1220. The work was vigorously carried on by Evrard and his successors, and, being complete in all its material parts, the new building was consecrated forty-nine years afterwards by Bertrand d'Abbeville, the fifth bishop from Evrard. The ornamentation was continued for twenty years longer, but the great towers were not built till the next century. It appears, from some verses in old French inscribed on the pavement of the nave, that the Cathedral was the work of three principal architects—Maistre Robert de Lusarche, Maistre Thomas de Cormont, and Maistre Regnault. The thirteenth century appears to have been the Augustan age of Gothic Art in France, and nearly all the finest specimens of the style are to be referred to this period. Besides Amiens, the Cathedrals of Paris, Rheims, and Lyons, the Churches of St. Nicaise at Rheims, and of Notre Dame at Nantes, the Sainte Chapelle of Paris, and others, remain to attest the fact.

Amiens Cathedral is built in the usual form of a cross, and consists of a nave and choir in one direction, and a transept in the other. Both nave and transept are furnished with aisles, and there are double aisles on each side of the choir. The windows of the Cathedral are arranged in two tiers, and are of unusual size. They are divided from each other only by narrow buttresses, which, being seen edgewise, are scarcely visible from the interior. This produces a light and airy effect, which is very striking. The buttresses shoot up into pinnacles above the roof. To the eye the only solid mass of masonry is the western front, represented in the illustration. It contains three great portals, the central one of which is of

colossal dimensions. The wall is so deep as to admit of eight parallel rows of statues in each doorway, running up and ribbing the arch. The whole front is gorgeous in the extreme, armies of saints, martyrs, and angels crowding the walls and swarming round the pinnacles. In many of the these figures we observe a correctness of taste rarely found in Gothic sculpture, with a simplicity and beauty that would do honour to a better school of Art. Above the central door, and at each extremity of the transept, are noble circular windows.

The interior is equally magnificent. Perhaps the most remarkable feature is a colonnade terminating the choir, and penetrated with lancet-shaped arches.

The Cathedral contains the tombs of Bishops Evrard and d'Abbeville, with other monuments of artistic and historical interest. Some apocryphal relics are also exhibited. These once included the head of John the Baptist, said to have been brought from Constantinople at the beginning of the thirteenth century.





YORK MINSTER.

As a specimen of English Gothic, York Minster stands unrivalled, and it receives additional interest from the various changes it has undergone; which do not, however, as in the case of some other of our Cathedrals, impair the unity of the whole.

The first church built upon the site of York Minster was

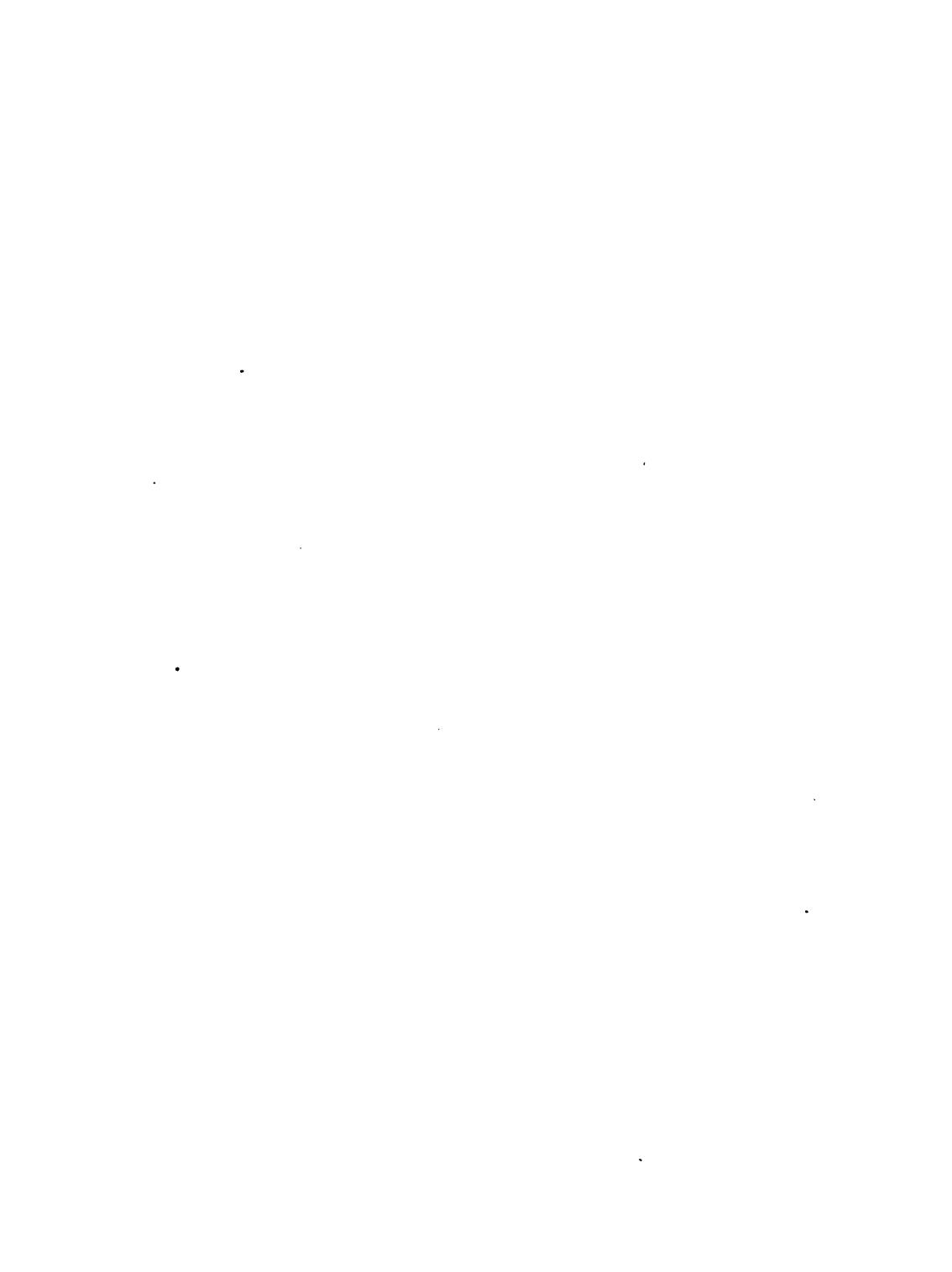
founded by Edwyn, King of the Northumbrians, who was converted to Christianity A.D. 627. It was scarcely finished when Edwyn was slain in battle. His head was interred in the Cathedral, and his body in the Monastery of Whitby. This and two succeeding churches were destroyed by fire, and in 1171, Archbishop Roger began to rebuild the choir in the Norman style, with circular arches, massive pillars, and an entire absence of ornament. York Minster was, however, afterwards entirely renewed, and little by little the present stately pile arose. The oldest part of the present edifice is the southern transept, which dates from the reign of Henry III. At this time the heavy pillars had given place to clusters of slender columns. Rich foliage adorned their capitals, the windows were made high and pointed, and light tracery ran round the vaultings of the roof. The northern transept was built, in the same style, about the year 1260. The first stone of the nave was laid in great state in 1291, and the two western towers completed about 1330. The materials for building the nave were supplied by Robert de Vavasour, and Robert de Boulton, Earl of Boulton, whose memory is preserved by two statues at the east and west ends of the Cathedral.

The choir, as built by Archbishop Roger, not corresponding with the rest, was taken down, and a new one erected in 1365. The great east window dates from the reign of Henry IV. The glazing was executed by John Thornton, of Coventry, who received during three years 100 shillings per annum, besides four shillings weekly and ten pounds at the close of the work—a liberal remuneration, if the difference in the value of money be taken into account. The interior of the Minster equals the exterior in grandeur, and exhibits in a

striking manner the progressive styles of architecture from Henry III. to Henry VII. inclusive, with the last of whom Gothic Art may be said to have expired in England. The newest portion, but not the least beautiful, is the organ screen, at the entrance of the choir. It is of florid character, and ornamented with fifteen statues of the Kings of England.

On the morning of February 2nd, 1829, York Minster was discovered to be on fire. One of the choristers accidentally fell on his back in passing through the Minster-yard, and, before he could rise, saw smoke issuing from the roof. When the doors were opened, the wood-work of the choir was discovered to be in flames. They soon spread to the roof, which shortly after fell in. The pews in the choir were completely demolished, and the organ consumed. The fire was found to be the work of a crazy fanatic, named Martin: he was tried at York, found to be insane, and imprisoned for life in Bethlehem Hospital.

The restoration of the Minster was immediately undertaken under the superintendence of Mr. Smirke, the architect of the British Museum; and during the progress of the repairs many interesting discoveries were made: among them was a series of Norman pillars, the remains of an ancient crypt under the choir, and no doubt forming part of the church built by Archbishop Roger.





COLOGNE CATHEDRAL.

COLOGNE is not a handsome city, the streets being narrow and dirty, and the domestic architecture of a mean description. It contains, however, some interesting public buildings, of which the most celebrated is its unfinished Cathedral, the traditional sepulchre of the Wise Men of the East. Scripture affords no information as to their number, rank, or names; but these

points are satisfactorily settled by the legend, and the sarcophagus containing the bodies of Gaspar, Melchior, and Balthasar, the three Kings of Cologne, may be inspected by any one who chooses to pay the price of the exhibition. The Cathedral, itself although dedicated to St. Peter, is more generally known as the "Church of the Three Kings."

Had the original plan been carried out, Cologne Cathedral would have been, as its pious founder intended, the most stupendous and the most beautiful of Christian temples. Even in its present condition, crumbling with age and overgrown with grass, it presents a noble spectacle.

The first stone was laid in the year 1284, by the Elector Conrad, called the Solomon of his age. His successors continued to build for 250 years, when they found their resources too limited for the extent of the design. One part (the choir) was, therefore, so far completed as to fit it for religious uses, and the remainder allowed to moulder away in ruins.

The choir is built in the richest style of Decorated Gothic architecture. It overtops the western towers, which were intended to be 500 feet high. One of them has been carried to about a third of this height, the other has only risen twenty-one feet from the ground. The great doorways, with their sculptured mouldings, are incomparably fine ; and the towers, as far as they are completed, are of corresponding beauty. A crane used in building the higher of the two, still projects from the summit. Once it was removed, but this open abandonment of the Cathedral was, according to the superstitious citizens, resented by a violent thunder-storm. They, therefore, replaced the crane, which has remained ever since to feed the lover of architecture with hopes that will never be realised. The present King of Prussia has done much to

restore and repair the building, but the works were interrupted by the revolutions of 1848, and since then they have been discontinued.

The grand altar is formed of a single slab of the finest black marble, sixteen feet in length. Behind it is the Tomb of the Three Kings, built by the Emperor Maximilian. Before the French occupation of Cologne, this shrine was of great splendour. It used to be opened every morning at nine, if two of the canons of the Cathedral were present, when the Magi were seen lying at length, with crowns of gold and precious stones on their heads. Their names, in purple characters, appeared in a small grate, decorated with pearls and jewels, among which was an Oriental topaz, the size of a pigeon's egg. Opposite, wax lights were continually burning, in six branches of silver. We are not informed of the precise amount by which the ancient treasures of this shrine have been diminished. The Cathedral and the Churches contain a profusion of other relics, doubtless of great interest to those who believe them genuine, such as the bones of the twelve Apostles, the heads of the father and mother of the Virgin Mary, the bones of the eleven thousand virgins martyred at Cologne in the seventh century, etc. etc. Besides which there are some monuments of real historical interest, such as the tomb of Conrad, founder of the Cathedral, of Marie de Medicis, and of Duns Scotus. The town itself enjoys two minor celebrities of opposite character. It furnishes the delicious perfume called Eau de Cologne, of which there are twenty-four makers, each claiming to be the successor of the original inventor; and it can also boast of producing a greater number of foul stenches than any other city in Europe. Coleridge declares that he counted seventy-two of them, all separate and well defined.





THE ALHAMBRA.

THE dominion of the Moors in Spain—where they reigned from the fall of the Gothic Empire, at the beginning of the eighth, till their final expulsion by Ferdinand at the close of the fifteenth, century—forms one of the strangest yet most splendid episodes in history. Repelled by Charles Martel within the limits of the Pyrenees, the Moslems abandoned

for awhile their lust of conquest ; and, devoting themselves to the arts of peace, formed an empire unrivalled, while it endured, for prosperity and civilisation.

It was in the noble city of Granada that the Moors made their last stand for empire ; and to this day, it is the object of their most cherished recollections. Granada is described by the Arabian writers as a terrestrial Paradise. Magnificent fountains adorned every street ; and the orange and the myrtle imbued the air with fragrance. In this favoured spot was found whatever tended to promote comfort or luxury.

But the crowning glory of Granada was the Palace of the Alhambra, erected by the second Sultan, and used as a royal residence by himself and his successors. Built on the northern brow of a hill overlooking the city, it is approached by a steep avenue leading, through a narrow ravine, to a huge Moorish tower, forming a kind of barbican. The great vestibule is composed of an immense arch, of the horseshoe form so common in Moorish architecture. On its keystone is sculptured a gigantic hand ; and on the portal a key of corresponding size. Tradition affirms that when this hand shall reach down and grasp the key, the whole pile will fall and reveal the treasures buried beneath it.

Passing through the barbican and along a narrow lane, the traveller reaches an esplanade, called the Place of the Cisterns, from the reservoirs cut by the Moors in the solid rock, for the supply of the fortress. In front of this esplanade is the unfinished building of Charles V., "appearing," says Washington Irving, "like an arrogant intrusion." Passing by it, and entering at an unpretending portal, we are in the Palace of the Moorish Kings.

The internal arrangements are beautifully simple. The Courts are so placed as to seem a continuation of the apartments; and, the whole being on one level, the view must have been one of enchanting beauty; halls and galleries, porticoes and columns, arches and mosaics, with plants and flowers of various kinds, being seen through the haze arising from the spray of the fountains. Sometimes the water sported in the air, sometimes it spread in broad sheets reflecting the surrounding objects and the deep blue sky.

The principal Court of the Alhambra is that known as the Hall of Lions. In its centre twelve enormous lions support a marble fountain from which, and from the lions' mouths, a volume of water falls into a reservoir communicating with the private apartments. This court is encompassed by a colonnade fantastically adorned with foliage and grotesque ornaments, the Koran prohibiting any representation of animal life. Here the hand of time has fallen lightest, and the decorations retain nearly all their first brilliancy.

One can hardly read without sadness of these relics of a gallant and cultivated race. For nearly eight centuries they were a distinct people, and they have scarcely left a distinct name behind them. Beggars and wayfarers haunt the Courts of the Alhambra; and the descendants of the last Sultan of Granada were paupers in the African town of Fez, little more than a century after the fall of their ancestors' kingdom.

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THE KREMLIN.

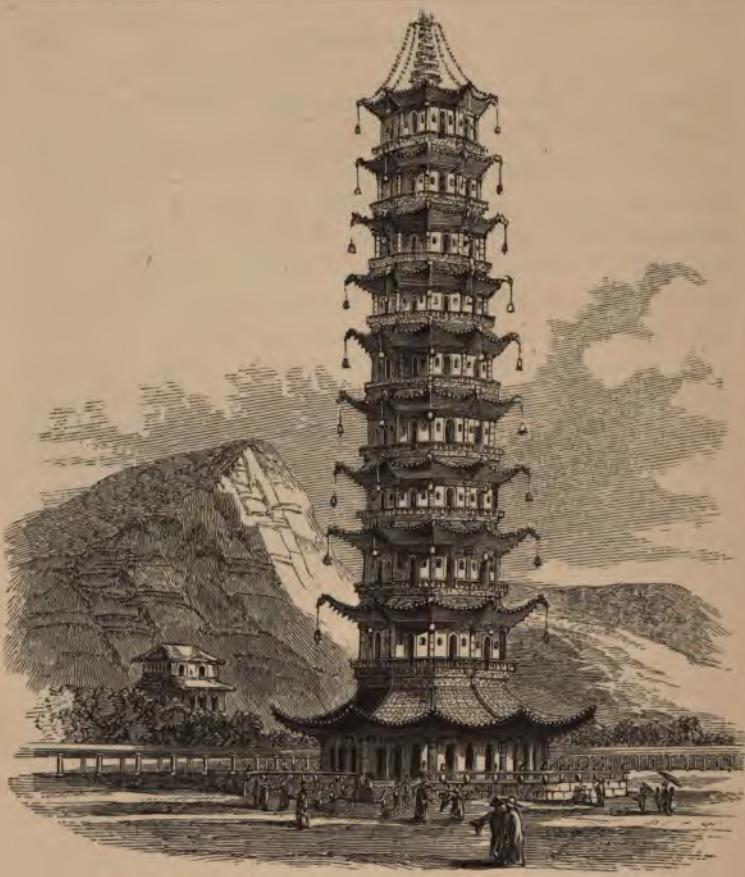
Moscow, the ancient city of the Czars, was founded by George, son of Wladimir, who reigned about A. D. 1150. Under his successors, however, the town fell into decay, and was rebuilt at the close of the thirteenth century by Daniel, son of Alexander Newski, who, when the empire was divided, received the Duchy of Moscow as his portion. The spot now occupied

by the Kremlin was at that time a morass, overspread with wood, and containing a small island with a single hut. Here Daniel constructed numerous buildings, chiefly churches and monasteries, and surrounded the whole with wooden fortifications. The new metropolis was enlarged by his son Ivan and his grandson Demetrius, who enclosed it by a brick and stone wall. Notwithstanding these fortifications, the place was taken in 1382, by Tamerlane. This desultory conqueror soon evacuated it, and the Kremlin again came into possession of the Russians; but was frequently occupied by the Tartars, who overran the country during the fourteenth and fifteenth centuries, and even maintained a garrison at Moscow, until finally repelled by Ivan Vassilivitch. To him chiefly the Kremlin was indebted for its splendour, and under him Moscow became the capital of the Russian empire.

The word Kremlin, though sometimes used for the ancient palace of the Czars, is more properly applied to the central quarter or fortress of the city. Indeed, "Krem" or "Krim" signifies a fortress in the Tartar language. The enclosure is of triangular form, about two miles in circumference, and surrounded by walls of great thickness, with battlements, embrasures, towers, and five gates. The palace itself consists of the remains of the ancient abode of the Czars, and of the new palace founded in 1743, destroyed in the great conflagration of Moscow, and rebuilt in 1816. Taken as a whole, the Kremlin presents a quaint but magnificent spectacle; and it receives an Oriental aspect from the number and variety of the towers (of which every church has several, besides the steeple), with bulb-shaped summits, or rising in lofty pinnacles like minarets; and from the numerous gardens and trees intersected with the buildings.

By the Russians, Moscow and the Kremlin are regarded with a feeling of veneration which we should find it difficult to associate with any building or set of buildings. It is interesting to observe the affectionate admiration with which the natives, and especially the peasantry, characterise the city as "Mother Moscow," or "Stone Moscow." This last appellation is far from correct; but the Russians are not over particular in their application of epithets. Thus, all the buildings in the quarter "Kitai Gorod" are called stone houses, though there seems no other ground for this than the fact that the quarter is surrounded by a stone wall.

The Kremlin suffered but little during the fearful conflagration of 1812; and, indeed, after this, as after the many other disasters that have befallen Moscow, the city has each time risen, Phoenix-like, with increased splendour from its ruins.



THE PORCELAIN TOWER OF NANKIN.

AMONG the fantastic specimens of architecture which abound in China, the pagodas are perhaps the most singular of all. Like the round towers of Ireland, their history is unknown, or at most traditional. They are now, for the most part, devoted to Buddhism, but the inconvenience of their shape for religious rites makes it improbable that such was their first destination.

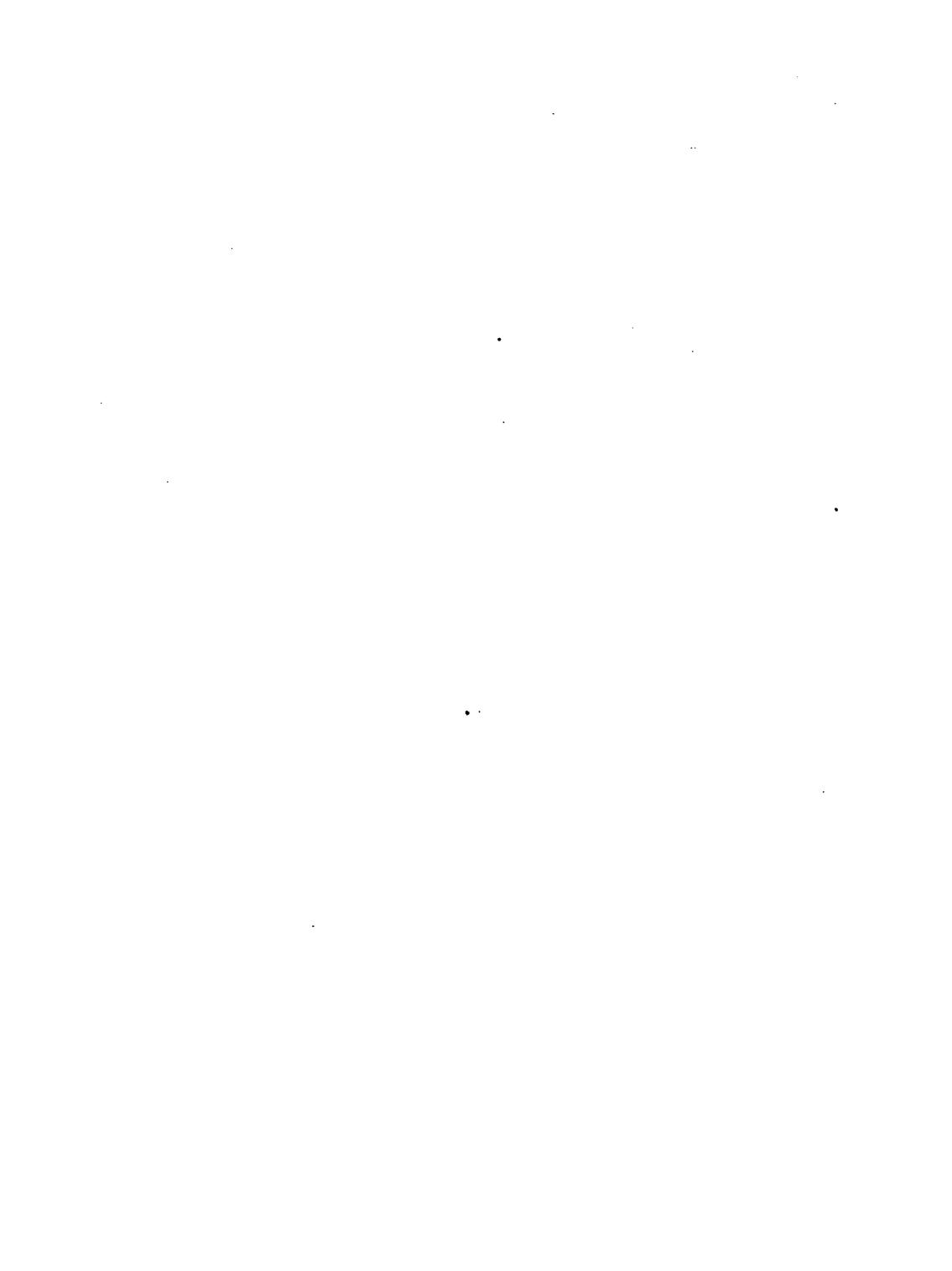
The largest and most remarkable of these pagodas is the famous Porcelain Tower at Nankin. In form octagonal, it consists of nine stories, tapering to a height of 300 feet, and surmounted by a cupola, encased in shining metal. From a gilt ball on the cupola rises an iron rod, sustaining eight chains, which descend to as many dragons' heads. To these chains, and at the angles of the tower, are hung 152 bells, which (say the attendant Bonzes, or priests) once sounded in harmony, but, in consequence of the long neglect of religious rites, were deprived of their voices by the offended deity. The body of the walls is of brick, cased within and without with slabs of beautiful white porcelain. The projecting roof of each story consists of green and yellow porcelain tiles in alternate rows; and running up the angles are mouldings of larger tiles, coloured green and red alternately. From each story projects a balcony, enclosed by a light balustrade of green porcelain. Upon this balcony four doorways open, of which the arches are elegantly turned with glazed tiles, representing monsters of every description. On the outside of the nine stories are 128 lanterns, made of thin oyster-shells, a Chinese substitute for glass. They are occasionally lighted up at the expense of some devout worshipper, and the effect of their delicate subdued light upon the surface of the porcelain is said to be very striking. The Bonzes teach that these lanterns illuminate the whole world, together with the thirty-three heavens; that they relieve good and evil men, and avert for ever many calamities incident to humanity.

The interior of the pagoda contains on its walls a number of idols, in relief, and on each floor is an image of Buddha, surrounded by 400 smaller images and other objects of idolatry. Twelve lamp-bowls of porcelain are preserved in

the great hall upon the ground-floor, and these are also lighted on the occasion of the general illumination of the pagoda.

According to the monks of the adjoining Buddhist monastery, who have preserved some traditions, more or less authentic, of this curious structure, the first stone was laid A.D. 1412, by Yung Lo, of the Ming dynasty, and the construction of the pagoda occupied nineteen years. It was raised as a tribute of gratitude to the empress, and as a record of her virtues. It still retains the name of Paou-gan-sze, or the Temple of Gratitude.

For many ages the Porcelain Pagoda withstood the effects of time, but in 1800 it was struck by lightning, or, according to the Chinese account of the disaster, "The God of Thunder, displaying his power and severe majesty, and driving some strange insects before him, struck the tower, and in a moment shattered the sides of the nine stories." It was repaired well and thoroughly in the year 1802, from which period it sustained no injury until the occupation of Nankin by the English in 1842, when a party of sailors endeavoured, with hammers and pickaxes, to remove the curiosities on the walls, inflicting, of course, much damage on the structure. These proceedings were not, however, countenanced by the English authorities. They interfered immediately that the outrage was known to them, and made full reparation for the injury.





THE TOWNHALL OF LOUVAIN.

THE Townhall of Louvain, in the Netherlands, is one of the most interesting monuments remaining of a period when the rich and powerful inhabitants of great commercial towns vied with princes in their displays of grandeur and magnificence; when, by their collective influence and authority, they successfully resisted the oppression of the feudal lords; and

when, lastly, a liberal expenditure upon objects calculated to elevate the taste of the community was justly thought one of the first duties of those to whom their government was intrusted.

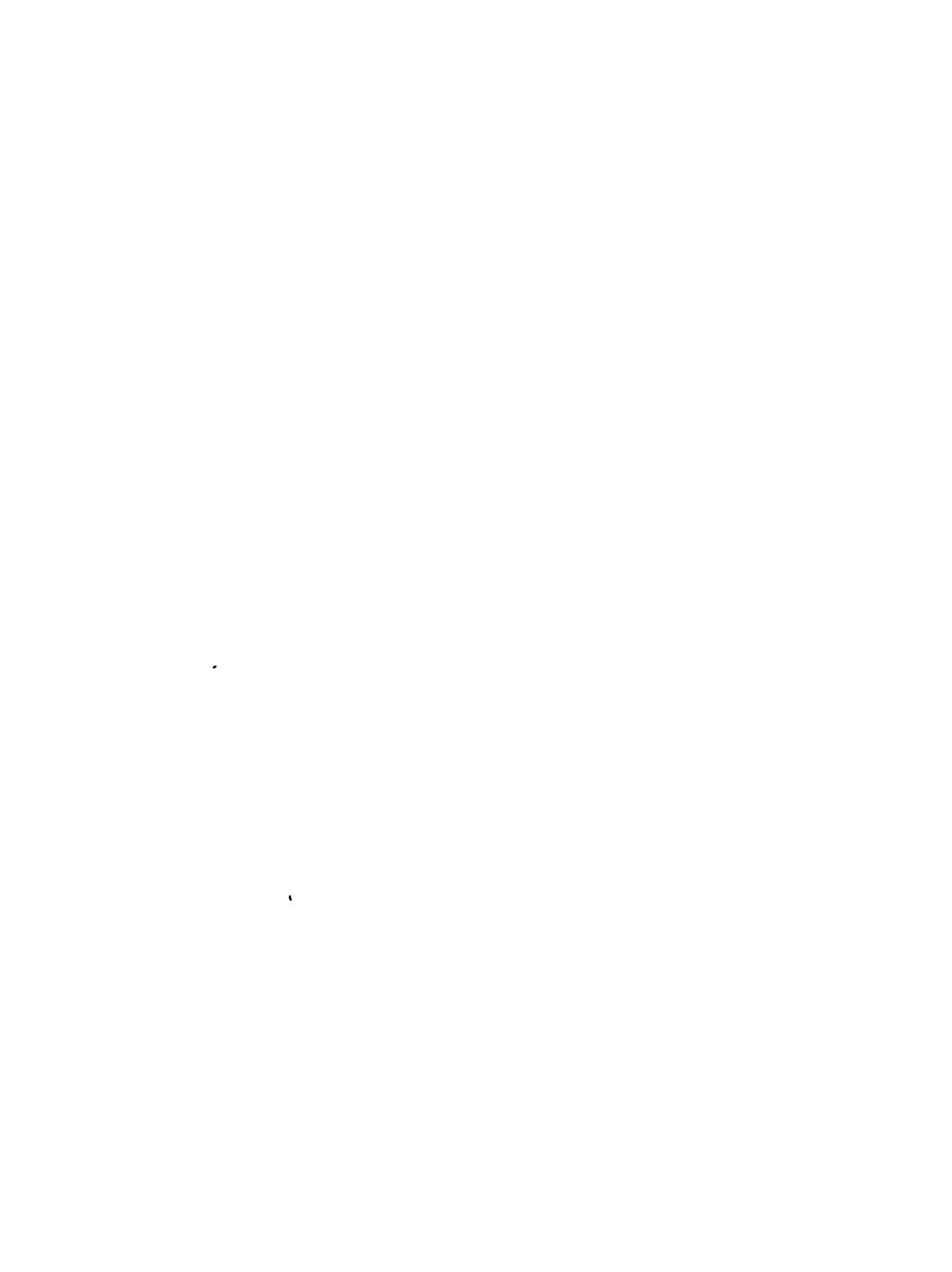
Louvain is said to have been founded by Julius Caesar, but there is no distinct notice of it until the year 885. Towards the beginning of the fourteenth century, however, it had attained great prosperity ; for we read that it comprised at that time 4,000 houses of clothiers alone, and that the population was 300,000. When the operatives left their daily work the great bell was always rung, in order that mothers might remove their children in the streets, lest they should be trampled to death by the eager throng of passengers.

In 1380, the workmen revolted, and seventeen of the principal magistrates were thrown from the windows of the Town-hall. This led to the emigration of many of the weavers, and inflicted a blow on the prosperity of Louvain from which it never recovered. At present the town is much decayed, and its population does not exceed 25,000. The only important article of commerce is beer, of which large quantities are annually exported. There are also ten or twelve lace manufactories.

During its prosperity, Louvain was no less distinguished for learning than for wealth. A university was founded there in 1426, by John IV., Duke of Brabant. It was endowed with high privileges by the Pope, and produced many men of eminence. The university contained forty-three colleges, a fine library, a botanical garden, and an anatomical theatre. In the sixteenth century it educated 6,000 students ; but it was suppressed during the French Revolution, and, though re-established after the separation of Belgium from France,

never recovered its original importance. The number of students does not at present amount to 600.

The first stone of the present Townhall was laid in 1448, and the building finished in 1463. The cost was 32,900 guilders, or about £3,000—a large sum in those days. The most characteristic features of the edifice are the three tiers of windows, the gallery above the upper tier; the lofty roof, with its windows rising one above the other; the corner towers and pinnacles, and the still more lofty pinnacles of the centre. The sculpture of the stone-work is exceedingly elaborate. The apartments within are of noble proportions, and richly decorated with tapestry and pictures.





ST. PETER'S.

ON the side of the Vatican Hill, on the north bank of the Tiber, beyond the limits of ancient Rome, towers the Basilica of St. Peter's. On its site once stood the Circus of Nero, where so many of the early Christians suffered martyrdom, and where the Apostle Peter is said to have been crucified.

It was Constantine the Great who first erected a Christian church on this blood-stained spot. The edifice, after standing for twelve centuries, was menaced with ruin. Several Popes

endeavoured to avert this by repairs and additions, and in 1503, Julius II. determined to build on the same ground an entirely new temple. For nearly three centuries a succession of pontiffs and architects bestowed their energies on this vast undertaking; but their fame merges in that of the great sculptor, painter, and architect, Michael Angelo Buonarotti, who devoted to the Cathedral eighteen years of his life, and stamped it with the impress of his sublime genius. His well-known boast, "Such a cupola" (alluding to that of the Pantheon) "will I suspend in the air," is hardly felt as an exaggeration by the traveller who, approaching the Eternal City, beholds the dome of St. Peter's towering into the blue heavens.

Unlike our own St. Paul's—which is closely hemmed in by ignoble buildings—and of which no satisfactory view can be obtained from any one point, St. Peter's presents itself as the background of a spacious amphitheatre, formed by a lofty colonnade, each wing of which is a perfect forest of pillars. An Egyptian obelisk, which once adorned the Circus of Nero, stands in the centre of this piazza, and somewhat detracts from the effect of the Cathedral. On each side of the obelisk is a noble fountain, fed by an ancient aqueduct from a lake seventeen miles distant. The supply of water is so abundant that, but for its transparency, the fountains themselves would be completely hidden from sight.

The Cathedral appears to the best advantage from elevated points in the neighbourhood, such as the Pincian Hill. It is there, and upon the Bridge of St. Angelo, that the people of Rome chiefly congregate on St. Peter's-day, and on the anniversary of the reigning Pontiff's election. On these two festivals, at one hour of the night (an hour after sunset), the dome is suddenly converted, as if by magic, into a mass of

liquid light. To effect this a great number of workmen are suspended to the exterior, and fire at the same instant the torches and lamps by which the Cathedral is illuminated. The service is dangerous—so dangerous that the men will not undertake it until they have confessed and received absolution.

Nor is the interior less grand and beautiful, though, from the wonderful harmony of its parts, the size is not immediately apparent. St. Paul's might stand within St. Peter's, and leave a clear space around and above it of fifty or sixty feet; yet, everything being on an equal scale of greatness, the eye is deceived, and the first impression is one of disappointment. The figures of the four Evangelists, for example, which adorn the cupola, appear no larger than life, though the pen in the hand of St. Mark is six feet long. It must be admitted that this harmony is in one sense a defect, and that Gothic architecture, with its vague profusion of details, is far more impressive and sublime. The purest taste has presided over the internal decorations. There is here no tawdry finery—no infant Saviour, with white wig and red waistcoat—no loathsome representations of foul diseases hung up as motive offerings, such as inspire disgust in so many Catholic churches on the Continent. The gorgeous profusion of ornament has been guided by so correct a judgment that nothing shocks or offends the eye—all is grand, rich, magnificent, and solemn.



ST. PAUL'S CATHEDRAL.

THE earliest building ascertained to have occupied the site of our metropolitan Cathedral was a Christian church, built and dedicated to St. Paul, about A.D. 610, by Ethelbert, King of Kent, the first Saxon prince converted by St. Augustine. It has indeed been supposed that the Romans, during their occupation of Britain, erected on this elevated spot a temple

to Diana. But the tradition seems to have no other foundation than the fact of the ground having been used as a cemetery by the Romans and their successors. When digging the foundations of the present edifice, Sir Christopher Wren discovered, at a considerable depth beneath the surface, a quantity of Roman sepulchral urns and lachrymatories. Over them lay, in rows, skeletons of the ancient Britons, and immediately above these were found the remains of Saxons, enclosed in stone coffins, or in graves lined with chalk, many of which contained the pins of ivory and boxwood used to fasten the grave-clothes.

The church built by Ethelbert was burnt down in 961, and a new one erected, which, being completed within the space of a single year, can hardly have been a magnificent or extensive structure. This, also, was destroyed by fire in 1087, when the Norman bishop, Mamki, undertook, at his own expense, to rebuild it on a large scale. For forty years, Mamki and his successors devoted the whole of their revenues to this great work, which was only brought to a close in 1240 under Niger, the fifth bishop from Mamki.

This fabric, which is known as "Old St. Paul's," and was the immediate predecessor of the present Cathedral, presented a mass 690 feet by 130 feet, and surmounted by a wooden spire 320 feet high. It was, no doubt, a grand and imposing structure. In 1315, the spire being much decayed, the upper portion had to be taken down and replaced. It was upon this occasion that St. Paul's was first surmounted by the ball and cross.

Long before its final destruction by the great fire of London, the Cathedral underwent so many changes from neglect and repeated accidents, that it presented little else

than a heap of confusion and incongruities. Towards the close of the sixteenth century, the benches outside the doors of the choir were used as sleeping-places by vagrants and drunkards, and a large dunghill lay undisturbed within one of the porches. Against the walls were built more than twenty private houses, the owners of which cut closets in the walls of the sacred edifice, and opened passages into the vaults, which they used as cellars. One person made an oven in one of the buttresses, and therein baked his bread and pies. During the civil wars, too, the revenues of the see being confiscated by the Parliament, the greater part of the Cathedral was used for barracks and stables. The service was still performed at the east end, which was walled off, the congregation entering through one of the windows.

After the fire of London, Sir Christopher Wren was directed to examine the ruins of Old St. Paul's. It was at first thought that a considerable portion might be retained; but the idea was abandoned, and the first stone of the present building laid on the 21st June, 1675. The work proceeded without interruption till its completion in 1710, being directed during the whole period by the great architect above mentioned. All that he received for his services was £200 a year; and after the building was considerably advanced, one half of this paltry salary was withheld by the Commissioners until the Cathedral should be completed—the pretext being that they would thereby secure greater diligence and expedition on the part of the architect.

It is worthy of remark that, while St. Peter's was the work of twelve architects, and exhausted the revenues of nineteen popes, St. Paul's was begun and completed under one bishop, by one architect, and one master-mason.



THE EDDYSTONE LIGHTHOUSE.

ABOUT fourteen miles S.S.W. of Plymouth lie the Eddystone Rocks, so named from the eddy occasioned by the water striking against them. They formed a most dangerous obstacle to navigation. Many a gallant ship, after crossing the Atlantic in safety, has foundered upon them, and, with its crew, gone down in sight of land.

It was of the utmost importance that mariners should be protected from these dangers ; and in 1698, Mr. Henry Winstanley, a rich gentleman with a natural turn for mechanics, but neither engineer nor architect by profession, undertook to erect a lighthouse on the Eddystone Rocks. The building constructed by him appears, from the description, to have somewhat resembled a Chinese pagoda. Angular in form, covered with projections, and furnished with open galleries, it must have been more adapted to adorn a London citizen's suburban garden than to withstand the fury of the Atlantic. Such, however, was not the opinion of the architect. He was so confident of its stability, that he expressed a wish to be in his lighthouse during "the greatest storm that ever blew under the face of the heavens." His desire was gratified. In the terrific storm of November, 1703, he perished with every person in the building. Next morning, not a vestige of it remained, except an iron chain that had become wedged in a cleft of the rock.

Three years afterwards, another amateur, Mr. John Rudyerd, a silk mercer on Ludgate Hill, undertook to erect a new lighthouse. He appears to have been a man of considerable sagacity. Unlike his predecessor, he bestowed some thought on the form most suitable for such a structure ; and his lighthouse, which was chiefly constructed of timber, stood until December, 1755, when it was accidentally burned down ; a spark, from one of the twenty-four candles kept constantly burning, having probably ignited either the woodwork or the flakes of soot hanging from the roof.

Before undertaking to build a new lighthouse, the owners prudently consulted the President of the Royal Society, who recommended Mr. Smeaton, another self-educated engineer,

as the person best qualified to superintend its construction. Smeaton spent much time in considering the best methods of grafting the foundations on the rock, and of giving the building the form best suited to secure stability. The design eventually adopted by him was suggested by the trunk of an oak, which spreads out in a sweeping curve near the roots, diminishes as it rises, and again expands at the insertion of the boughs. To prepare a fit base for the tower, the shelving rock was cut into six steps, which were filled up with masonry dovetailed together, and riveted to the living stone, the upper course presenting a level surface. For the height of twelve feet above the rock the building is solid. Each course of masonry is dovetailed together, and secured to the course below by plugs of stone which effectually resist the lateral pressure of the waves. The interior consists of four rooms, situated one over the other, and surmounted by a glass lantern.

The first stone was laid on the 12th of June, 1757; and on the 16th of October, 1759, the saving light again streamed over the waters. During all this period, the actual time spent on the work was only 111 days 10 hours, or less than sixteen weeks.

The Eddystone Lighthouse has stood ever since, and promises to remain for centuries. Among many tempests which it has endured unshaken, was the memorable one of the year 1762. On the morning after the storm, many anxious observers pointed their glasses at the lighthouse, scarcely expecting to see it again. But it was still erect and uninjured, even to a pane of glass in the lantern. The only article required to repair it was a pot of putty to replace some that had been washed away.





STATUE OF PETER THE GREAT.

At the western extremity of the Admiralty of St. Petersburg stands a colossal equestrian statue, erected by the Empress Catherine the Second to the memory of the founder of the city. In the mind of the Russian it awakens proud associations, for under Peter the Great the country emerged from barbarism, and his reign forms the great landmark in Russian

history. Nor can the stranger pass the statue without being struck by its artistic merit, and by the grandeur of the original conception. The pedestal forms an inclined plane, up which the horse is prancing. His imperial rider surveys with a serene countenance his capital rising out of the waters, and extends over it the hand of protection; while the horse rears with his fore-feet in the air, and seems impatient of restraint. The bold manner in which the group is made to rest on the hind legs of the horse is not more surprising than the skill with which advantage has been taken of the allegorical serpent in upholding the gigantic mass. The attitude has afforded a fine opportunity for the display of anatomical knowledge on the part of the sculptor, Falconnet. The figure of the Czar is full of fire and animation. He is clad in a simple tunic and mantle, and is seated on a bear's skin, emblematical of the country he regenerated.

It is said that as soon as Falconnet had conceived the design, he communicated his ideas to the Empress, at the same time declaring the impossibility of realizing them without a living model. Upon this an officer, who had the reputation of a bold horseman, offered to ride his charger daily to the summit of a steep artificial mound. In the presence of a crowd of spectators he repeatedly performed this dangerous feat, accustoming his horse to gallop up the ascent, and halt suddenly, pawing the air with his feet over the brink. The sculptor was thus enabled to sketch the various attitudes of the animal before commencing the statue.

The group was cast at a single jet. The figure of the Emperor is eleven feet in height, that of the horse seventeen. The bronze is in some places but a quarter of an inch, and nowhere more than an inch in thickness, yet the total weight is

between sixteen and seventeen tons. The pedestal is not less remarkable than the statue. It consists of a huge block of granite, brought from a marsh four miles distant from St. Petersburg. A grooved tramway was fastened to the under surface, and a similar tramway laid on the ground. Cannon-balls were placed in the grooves, and as the rock was moved onwards by ropes, pulleys, and windlasses, the balls over which it had passed were brought to the front, a drummer being stationed on the top to give the necessary signals to the workmen.

On one side of the pedestal is fixed, in bronze characters, the simple legend, PETRO PRIMO. CATHARINA SECUNDA. MDCCCLXXXII.; and on the opposite side appears the same inscription in the Russian language.

An amusing incident occurred a few years since. Some American sailors sallied forth on a frolicksome cruise, and one of them, climbing over the palisades, mounted the rocks and seated himself behind the Emperor. He was speedily arrested, and, after a night's incarceration, brought before the police authorities. His case was summarily disposed of, and so heavy a fine inflicted that he naturally remonstrated. "No, no," said the officer, "we can make no abatement; if you will ride with great people, you must pay great people's prices."



MENAI SUSPENSION BRIDGE.

SUSPENSION bridges are in themselves no novelty. Not to mention the obvious expedient resorted to in most mountainous countries of stretching a rope or ropes across a river in order to afford communication between the opposite banks, bridges constructed on the principle of those now in use have been met with by travellers both in the Old and New Worlds. In

the interior of Thibet and India we find many not unlike those recently erected in our own country. In one place, chains supporting a bamboo platform are raised over stone piers, with openings for the road to pass through. In another, the whole is constructed of twisted slips of bamboo, over which the road passes. Several of the latter kind have been found in Chinese Tartary. In the mountains of South America there are bridges composed of leathern thongs, or of the stems of creeping plants turned into ropes.

But, without leaving the United Kingdom, those who have visited the Giants' Causeway have probably inspected the hanging bridge at Carric-a-rede, near Ballintoy. It is formed by two cables stretched from the cliff to a rock in the sea, some sixty feet distant. The cables are fixed to hooks in the rock, and the other ends are kept tight by means of pulleys. The passenger walks upon a platform eighteen inches wide, and formed by planks laid side by side across the ropes. The bridge is eighty feet above the sea, and there is no other protection than a hand-rail or, rather, rope, three feet above the swinging pathway ; but over it men, women, and children pass and repass with the utmost unconcern ; sheep are also occasionally carried over on men's shoulders to browse on the scanty herbage of the rock. The bridge has existed longer than the present generation can remember, and it probably suggested the more important ones since erected.

About forty years since, Captain Brown, of the Royal Navy, first used iron rods, connected so as to form flexible chains, instead of the chains with small links which had come into extensive use in the navy. He invented an ingenious method (for which he took out a patent) of connecting the rods without diminishing their flexibility at the joints. The Union

Bridge, across the Tweed near Berwick, with a span of 450 feet; the pier of Newhaven, and the yet more remarkable chain-pier at Brighton, attest Captain Brown's engineering skill.

But all previous attempts were thrown into the shade by Telford's Suspension Bridge across the Menai Straits. The obstacle was a rapid stream with high banks. To have erected an ordinary bridge would have obstructed the navigation; and the erection of piers in the bed of the sea was, moreover, impracticable. Mr. Telford, therefore, conceived the idea of a suspension bridge, and the project was realised in 1826. The distance from shore to shore is nearly a quarter of a mile. There was a rock on one side on which a pier might be raised, but on the other nothing appeared above the water. He determined, however, to build another pier on the opposite shore, and to throw his bridge from one to the other, a distance of 550 feet. The piers were connected with the shores by arches of great size, the chains being carried over them and secured firmly to the rock on each side. The top-masts of the first ship that passed under the bridge were nearly as high as those of a frigate; but they cleared twelve feet and a half beneath the roadway.





THE THAMES TUNNEL.

THE Thames Tunnel, though now degraded to the level of a penny exhibition, and apparently destined to be of no further utility, was once the subject of universal interest in this country, and is still one of the first objects of attraction to foreigners. To the novelty of the idea were superadded the unexpected difficulties and hair-breadth escapes experienced

in its realization. Railways and their tunnels were as yet unthought of; and indeed the experience gained from them would have been of little assistance in overcoming the peculiar engineering difficulties of this undertaking.

As far back as the year 1802, a project was entertained, and a company formed, for opening an archway under the Thames. A shaft seventy-six feet deep was sunk on the Rotherhithe side, not far from the site of the present tunnel, and a small drift-way carried a thousand feet across the river, when, although within a short distance of the opposite shore, the undertaking was abandoned, owing to the repeated influx of sand and water.

In 1823, Mr. Brunel was induced to turn his attention to the subject, and devised a plan for making, without any preliminary drift-way, an excavation of sufficient size for two distinct archways, each large enough for a carriage-road and footpath. He is said to have taken the idea from the *teredo*, a destructive worm which bores its way into the hardest timber. He proposed to effect his object by means of a *shield*, or frame-work, which should support the face of the excavation, without leaving any considerable part unprotected. It consisted of twelve parallel iron frames. Each of them had a progressive motion of its own, and contained three cells placed one above the other, and each large enough to contain a single workman. The miners removed the ground in front by small quantities at a time; while other workmen at the back secured with brickwork the portion excavated.

The shield commenced its journey on the 1st of January, 1826, through a substantial bed of clay; but it had not advanced above nine feet, when this protection suddenly ceased,

and left the work exposed to a considerable influx of water and sand. For thirty-two days its progress was extremely slow, but by the 14th of March the shield again reached solid ground. At the close of the year, 350 feet of the tunnel were safely completed; though moist earth was being continually forced through the shield, and cavities in the bed of the river had to be filled up with bags of clay. On the 18th of May the river broke in, forming at first a transparent curtain of water between the shield and the brickwork. Every exertion made to oppose it proved fruitless, and the Tunnel rapidly filled. Fortunately no lives were lost, and the brickwork suffered no material injury.

In the following January, another and more formidable accident occurred. As Mr. Brunel, jun., was directing three workmen how to save themselves from the danger seen to be imminent, the ground burst in like a volcanic eruption. The lights were blown out, and Mr. Brunel reached the shaft in total darkness. But the water was at the top before him; and the waves had closed on the scene ere he emerged. The three men were less fortunate, and three others were also lost, whose death must be attributed to their own imprudent curiosity, as they were not at the time employed upon the works.

The new fissure was stopped by 4000 tons of soil, and the Tunnel again freed from water; but, the company's funds being exhausted, nothing more was done until 1835, when Government agreed to advance money for the completion of the undertaking. From that time, though the progress was sometimes very slow, and three more irruptions of the river took place, it advanced steadily and was completed in 1842, the shield having performed a journey of more than 1200 feet.



THE PINACOTHEK.

Of all European states, Bavaria is the most remarkable for the encouragement given to the Fine Arts. The late King, with all his faults, was an enthusiastic admirer of Architecture, Painting, and Statuary; and devoted nearly the whole of his private revenue to the adornment of Munich with fine build-

ings, filled with the productions of the best modern painters and sculptors.

Of these, the most considerable are two grand edifices named respectively the "Glyptotheke" and the "Pinacothek"; the first devoted to Sculpture, the second to Painting. The collection in the Glyptotheke is both rich and valuable, and contains the celebrated Egina Marbles, which, had they been purchased together with the Elgin Marbles now in the British Museum, would have made ours the most perfect collection extant of Grecian Art. But the Pinacothek rivals the finest galleries in Europe. It comprises the best pictures from the Dusseldorf Gallery, from the galleries of Manheim, Deuxponts, Heidelberg, and Ratisbon; and from the interesting Boiserie Gallery, collected by the two brothers of that name, who were for a long time employed in making selections of the productions of the early German painters, from various convents and other public buildings, and private collections.

The Pinacothek is built upon a grand scale. It is an oblong edifice, two stories high, with wings at its two extremities. Though chiefly built of brick, the balustrades and entablatures are of stone. The ground floor contains a collection of Etruscan vases and mosaics; the King's cabinet of drawings by the ancient masters; a rich collection of engravings; a library of works relating to the Fine Arts; with an entrance hall, and accommodations for the students and officers of the establishment. The upper floor alone is appropriated to pictures. Along the front of the building runs a corridor, 400 feet in length, and lighted by twenty lofty windows. On the side opposite the windows ten doors, open into seven spacious halls, devoted to the larger paintings;

and on the north side of these halls are twenty-three cabinets, in which are placed smaller pictures of the different schools contained in the adjoining halls.

The various saloons have been planned with especial reference to the pictures to be placed in them. The cabinets have their windows facing the north, and the central halls are lighted by lanterns in the ceiling, the light from which is so managed as to be uniformly distributed over the four sides of the hall. So perfect is this arrangement that, in looking at any one of the corners, it is next to impossible to distinguish the line of junction of the two walls; and but a slight shade of difference exists between the lightest and darkest parts of the room. The interior is admirably contrived, and the visitor to the gallery may, from the corridor, at once enter the particular school which he wishes to inspect, without first passing through the whole range of apartments, and having his mind distracted and his eyes dazzled by the multiplicity of objects contained in them.

The plan of decoration is similar in the Glyptotheke and Pinacothek. The ceilings are enriched with splendid ornaments in white and gold, and with portraits and medallions of the most celebrated painters. All these were designed by the architect, Baron Klenze, and executed by the first artists in Munich. The floors are inlaid with various coloured Bavarian marbles; and the walls hung with rich silks, of tints selected, as far as possible, to suit the different pictures.

The first stone of the Pinacothek was laid, by the King himself, on April the 7th, 1826 (the birth day of Raphael); but it was more than ten years before the internal arrangements and the placing of the pictures were completed.



THE HOUSES OF PARLIAMENT.

On the evening of Thursday, October the 16th, 1834, the south-west quarter of the metropolis was alarmed by continued and extensively spread cries of "Fire!" followed by the rush of engines, and of multitudes of people, towards the spot whence it arose. The conflagration was indicated at a great distance by a deep glow in the atmosphere, and proved to be at the House of Lords. It was about twenty-five minutes to seven when the first alarm was given, and by seven o'clock the flames raged with the greatest vehemence.

The fire arose in the portion of the building immediately opposite Henry VII.'s Chapel, and from thence the flames

took three principal directions. They first proceeded to the body of the House of Lords, taking within their range the apartment over the Piazza facing the Palace Yard ; thence they extended to the Painted Chamber and Library, which last was soon completely burnt, the roof falling in with an immense crash ; but the collection of books (which had fortunately been removed on account of some alterations in progress at the time) was preserved uninjured. By nine o'clock, all the apartments were in a blaze, and ere long, though the exterior wall remained standing, the interior was quite destroyed, and the fallen materials of the roof and ceiling continued burning like a furnace within the walls. Between ten and eleven, two great masses of the front fell in ; but the flames continued to rage, and other parts to fall, until the whole was reduced to such a state of dangerous ruin that it became necessary to level it with the ground.

Another direction taken by the flames was yet more destructive. Their course was eastward towards the river, where they swept all before them except the strong ancient walls. They next reached the Offices of the House of Commons, and most of the valuable books and papers were consumed. The Library shared the same fate, and, lastly, the House of Commons itself was attacked, all but the beautiful Chapel of St. Stephen, which stood, like a rock amidst a sea of fire, breaking the force of its waves, which, till then, had gone on conquering and overthrowing.

The other direction taken by the fire was westward, along the range of buildings facing St. Margaret's Church. The Members' Waiting-room on the ground floor, Bellamy's Coffee-house, and the Committee-rooms, were totally destroyed.

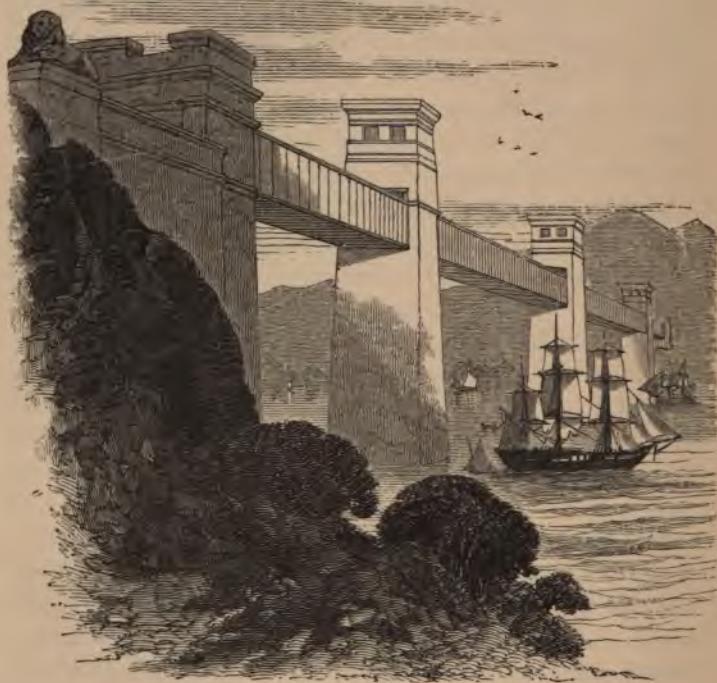
The attention of Government was immediately directed to

the erection of a new Palace, which should far surpass in grandeur the old building. The design of Sir C. Barry being accepted, the foundations of the new building were commenced in 1839, and the work is now steadily, though slowly proceeding towards completion. It is the largest, if not the most splendid, Gothic edifice in Europe, and covers at least double the site of the old Palace; about half the ground being redeemed from the river. The eastern or river front is shown in the engraving. This façade is 900 feet in length, and is divided into three principal compartments, panelled with tracery, and decorated with rows of statues and escutcheons of the Kings and Queens of England.

The western or land front will surpass the other in picturesqueness. It is of the same extent as the side facing the river, but in an interrupted line, owing to the nature of the ground. The House of Peers and the House of Commons are situated in the rear of the building, and are surrounded by Courts and Parliamentary Offices.

The architecture of the Westminster Palace somewhat resembles that of the Townhalls of the Low Countries. Exception has been taken to what is thought its uniform and monotonous character; and it must be confessed that, rich as are the details, they do not group into masses when viewed from a distance. There is, besides, too much of what has been termed "architectural stuttering" in the decorations; especially in the heraldic devices, which having no inherent beauty of design, should not have been needlessly repeated.





THE BRITANNIA BRIDGE.

WHEN the genius of Stephenson first conceived the idea of carrying a railway across the great tidal chasm of the Menai Straits, the task seemed, to all but the engineer, utterly impracticable. Telford's Suspension Bridge, of which we have already given an account, was, from its slight and flexible construction, inadequate to support the weight of a rapidly

moving mass, such as a train of engines and carriages; and the use of that bridge was, moreover, forbidden by the Commissioners of Woods and Forests.

At the point finally chosen by Stephenson, one of the narrowest that could be found, the ebbing and flowing torrent rushes through with such impetuosity, that it is often impossible for vessels to pull against it; besides which, the gusts of wind which come down the ravines and round the sides of the neighbouring mountains are so sudden and violent as to render any engineering operations both difficult and hazardous.

It was at first intended to cross the stream by two cast-iron arches, each of 450 feet span, or more than double that of Southwark Bridge, the greatest span hitherto attempted. But, this project being rejected by the Admiralty, a new one was, ere long, matured, and in the Britannia Bridge we see its realization.

The Bridge consists of two continuous hollow beams of wrought iron, placed side by side, and extending to a length of nearly 3000 feet. Advantage was taken of a rock in the centre of the channel to construct each tube in two portions, which were afterwards united firmly together. The following passage from Sir Francis Head, who saw one of them raised and in its place, will, better than a dry description, convey an idea of the Britannia Bridge:—

“ It seemed surprising to us, that, by any arrangement of materials, it could possibly be made strong enough to support even itself, much less heavily laden trains of passengers and goods flying through it, and actually passing each other in the air at railway speed. And the more we called reason and reflection to our assistance, the more incomprehensible did

the mystery practically appear ; for the plate-iron of which this aërial gallery is composed, is literally not so thick as the lid, sides, and bottom, of an elm coffin, $6\frac{1}{2}$ feet long, $2\frac{1}{2}$ feet wide, and 2 feet deep, of strength merely sufficient to carry the corpse of an emaciated friendless pauper from the work-house to his grave. The covering of this iron passage, 1841 feet in length, is literally not thicker than the hide of the elephant ! Lastly, it is scarcely thicker than the bark of the 'good old English oak,' and if this noble sovereign (notwithstanding the heart and exterior substance of which it boasts) is, even in the well-protected park in which it has been born and bred, often prostrated by the storm, how difficult is it to conceive that an attenuated hollow beam, no thicker than its mere rind, should by human science be constituted strong enough to withstand, besides the weights rushing through it, the natural gales and artificial squalls of wind to which, throughout its immense length and at its fearful height, it is permanently to be exposed !'

The Britannia Bridge was opened for the first time on the 5th of March, 1850, having been previously subjected to the severest tests. A train of 200 tons weight was placed in the middle of one of the tubes, and, two hours afterwards, was found to have bent it to the extent of less than half an inch ; while it was computed that the tube would have borne, without injury, a deflection of thirteen inches. And, during the terrific gales of the previous 5th of February, no vibration was detected in the Carmarthen tube, which was then erected, though not in a fair position for resisting the wind, since it only temporarily rested on a pile of planks, and was unconnected either with the neighbouring tubes or with the masonry of the towers.

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THE "DUKE OF WELLINGTON" STEAM-SHIP.

THE use of the screw for propelling vessels was first suggested in France, in the year 1735. In 1760, M. Paneton invented his *ptérophore*, on the same principle; and, for sixty years afterwards, a succession of patents were taken out by Mr. Millington, Mr. Bennet Woodcroft, and others, for screw-propellers of various kinds.

But the practical value of the propeller was not fully brought out until the year 1827, when Mr. Francis Smith, without putting forward any claims to originality, effected improvements which at once removed the invention from the domain of ingenious speculation into that of practical utility. Dissatisfied with mere theory, he determined to construct a vessel in which the principle might have a fair trial; but such was the opposition he encountered, that no engine-builder could be induced to risk his professional credit in the undertaking. At last, Sir John and Mr. George Rennie came forward to his assistance, and constructed the requisite machinery, each of them further aiding the adventure by a contribution of £1000. The first trial was made on a boat of six tons burden, which was propelled by the screw at a velocity of seven or eight miles an hour. She ran from Blackwall to Margate in eight hours and a half, and towed the "British Queen" steamer into the West India Docks. Since that time the application of the invention has steadily progressed, and the "Duke of Wellington" (now the flag-ship of Sir Charles Napier) exemplifies the largest scale on which it has yet been applied.

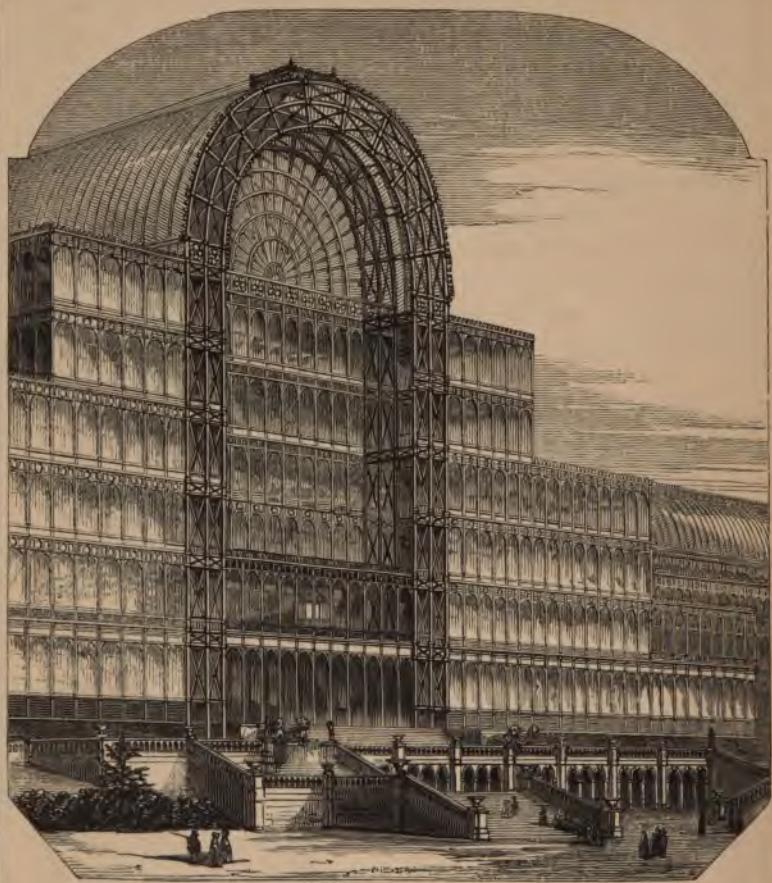
The history of the "Duke of Wellington" is somewhat eventful. Originally built on a smaller scale, it was cut in two by a remarkable and previously unheard-of process, then lengthened in midships some twenty-three feet, and further lengthened abaft for the accommodation of the screw-propeller. The midship lengthening was performed by cutting the ship asunder "at dead flat," and launching the after half to the required distance. This was done on the 3rd of February, 1852, the process occupying an hour and a half.

The launch of the "Duke of Wellington" (or, rather, of

the "Windsor Castle," by which name it was first called) took place on the 14th of September following. The concourse of people was immense at Pembroke Dockyard, where the vessel had been built, and a few minutes after five o'clock the mighty man-of-war began to descend into the water. When the vessel reached the end of the slip and was fairly afloat, she lingered before the mouth of her late abode, giving every person within an excellent view of her tremendous proportions.

The principle of the screw-propeller is not difficult to understand, though a minute description would occupy more space than can be afforded. It derives its power from a thread or blades extending from an axis parallel to the keel of the ship, so that by the revolution of the axis the blades worm their way through the water in the same manner as the carpenter's screw does when inserted into a piece of timber. The screw, however, in perforating the wood, is different from its watery counterpart, inasmuch as the latter, acting on a fluid, makes it recede, and by the reaction is itself forced in the opposite direction.

The "Duke of Wellington" is the largest ship in the world, measuring nearly 300 feet in length by 60 in breadth. The engines are of 800 horse-power, and the estimated weight of the vessel, when fully equipped, is about 5060 tons.



THE CRYSTAL PALACE.

EVEN before transplanted from its native soil in Hyde Park, this immense but fairy-like structure was as unique as it was beautiful; but on its present commanding site, and perfected by the master-mind which called it into existence, the Crystal Palace may take its place among the greatest, as in point of

magnitude it is the very greatest, Wonder of Art. Like the Pyramid of Cheops it is an expression of the genius of the age in which it arose, and the comparison of our first and last subjects might suggest many striking reflections on which we have not here space to enlarge.

The differences between the two palaces are visible at a glance. The parent edifice, although grand, was somewhat monotonous in character. This mainly arose from the great length of the building, which was broken by only a single transept. The Sydenham Palace has three transepts instead of one, and an arched roof covers the nave. A further improvement is the formation of recesses in the garden fronts of the transept. These break the monotony of the plain glass walls, and the effect is further varied by the square towers at the junction of the nave and transepts; by the open galleries towards the garden; and by the extensive wings stretching forth on either side. These additional details produce a play of light and shade, and present a variety of surface that charms and satisfies the eye, without detracting from the grandeur of the whole, or causing the parts themselves to appear mean or small.

If unity is one of the chief requisites in architecture, certainly no building possesses it in a greater degree than the Crystal Palace. The design is of the utmost simplicity, and all the parts correspond. Every portion of the framework is an exact multiple of some other, so that nearly the whole of the old materials were available for the new Palace.

In laying out the beautiful grounds the same uniformity has been adhered to as in the building itself. The width of the walks, the width and length of the fountains, the length of the terraces, the breadth of the steps, are all multiples, or sub-multiples of eight feet. By this symmetrical arrange-

ment, perfect harmony prevails between the structure and the grounds.

Advantage has been taken of the beauty of the surrounding country to extend the apparent extent of the park and gardens. Looking down from the terrace in front of the building, the visitor beholds them passing off into a scene of rural loveliness unmatched by any other so near the great metropolis. Undulating ground prevails; here rich with verdure, there dark with wood; here the grey soil, there fields waving with golden corn. Crossing the whole are visible long lines of hedgerows, with clusters of cottages and the familiar village spire, all telling plainly of the land to which they belong.

It would not be fair to close this short notice without offering a passing tribute to the enterprise of those gentlemen who secured this great school of Science and Art for the permanent use of the country. Most of our readers have heard of the vicissitudes of the Crystal Palace. Having served its original purpose, the greatest efforts were made to prevent the demolition of the building; but the influence exerted on the other side was too powerful to be resisted, and the materials would probably have been sold as old glass and iron had not Mr. Leech, a private gentleman, conceived the idea of rebuilding the Palace on an appropriate spot by the instrumentality of a public company. The project was warmly taken up by nine others, who purchased the building on their own responsibility. Experience has shown that in so doing they were guided by sound taste and correct judgment, and the humblest mechanic may now enjoy the fruit of their enterprise and public spirit.



